

CEREBRO-SPINAL MENINGITIS
IN MASSACHUSETTS.

BY J. BAXTER UPHAM, M.D.

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Cerebro-Spinal Meningitis

IN

MASSACHUSETTS ;

BEING A

Succinct History of the Epidemic of 1873,

WITH AN ANALYSIS OF UPWARDS OF 500 CASES, COLLECTED
FROM EVERY PART OF THE STATE.

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&c., &c.*

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CEREBRO-SPINAL MENINGITIS IN MASSACHUSETTS. —

The disease now denominated cerebro-spinal meningitis has long been known to the medical profession in the various countries of the civilized world. It has existed as an epidemic, at stated times, in Russia, Holland, France, Germany, Spain, Portugal, Sweden and Great Britain. It has occurred also, from time to time, under various names and divers forms and phases of development, in many parts of our own land. During the war of the rebellion it was seen in marked and fatal form in some of the important military posts both West and South. It was the fortune of the writer to observe the disease in its epidemic character as it occurred in the camps in and about the town of Newbern, in North Carolina, in the winter and spring of 1862-63. This was one of the first among its recent visitations as an epidemic in the United States. So long, indeed, had the affection been dropped from the catalogue of our prevailing diseases that, at first, the whole medical force in that Department were at a loss to know with what they had to deal. Coming, as it did, suddenly and without warning, it early arrested attention by the abruptness and intensity of the attack, the peculiarity of its symptoms, its protean developments, its oftentimes rapid course and fearfully fatal results. By some it was taken to be a new and unusual phase of intermittent fever; by others a severe malarial fever of the bilious remittent type; by others still, a malignant typhus, identical in its essential elements with the endemic fever of Great Britain, and which, under the various titles of hospital, jail or camp fever, putrid malignant fever, petechial fever, maculated typhus or ship fever, and other ill-favored names, "is known to lurk in the track of armies, and is familiar in the hovels and ill-drained and ill-ventilated houses of the poor and wretched"—with each and all which affections it seemed to present many symptoms

in common. It was not, indeed, till repeated post-mortem investigations revealed the unmistakable and striking lesions which belong to the disease in question, that its true character was recognized and established.

To give, in briefest form, a portraiture of the disease as it is now understood by the medical profession, I quote the following definition from a recent admirable monograph on this subject by Dr. Meredith Clymer,* as follows, viz.: "*An acute specific disorder, commonly happening in an epidemic, general or limited, and, rarely, sporadically,—caused by some unknown external influence,—of sudden onset, rapid course and very fatal; its chief symptoms, referable to the cerebro-spinal axis, are great prostration of the vital powers, severe pain in the head and along the spinal column, delirium, tetanic and, occasionally, clonic spasms and cutaneous hyperæsthesia, with, in some cases, stupor, coma and motor paralysis, attended frequently with cutaneous hæmic spots; the morbid anatomical characters being congestion and inflammation of the membranes of the brain and spinal cord, particularly the pia mater, although there is reason to believe that the evidence of these changes may be wanting, even in cases of long duration.*"

To this succinct and comprehensive, but purely technical, definition, it may not be out of place to add here some account of the essential characteristics of the disease, its habits, symptoms, progress and pathology, as seen in its epidemic and most prevalent form in this country. In its mode of attack it is commonly sudden and without premonition, the patient, for the most part, continuing about his ordinary duties and making no complaint till the very day of his seizure. The subjects of the disease, in most cases, among adults, and males especially, are those who have previously been in the enjoyment of sound and robust health, and have endured hardship and exposure with impunity. The symptoms at the first are headache, referred mostly to the back part of the head, of a severe, oftentimes excruciating, character; conjoined with this, or soon following, are violent pains in the nape of the

* EPIDEMIC CEREBRO-SPINAL MENINGITIS, *with an Appendix on some points on the Causes of the Disease, as shown by the History of the recent Epidemic in the city of New York.* By MEREDITH CLYMER, M.D. (*Univ. Penn.*), etc., etc. Philadelphia: Lindsay & Blakiston. 1872.

neck, extending down the spine, accompanied with a peculiar sense of stiffness in the muscles of the neck and lower part of the face. There is chilliness rather than a well-defined chill. Nausea and vomiting, in children especially, is an early symptom. There is generally soreness and tenderness at the back of the neck and along the spine. Sudden and acute pains in the joints is a not infrequent concomitant. As the disease advances there is great exhaustion; the breathing becomes irregular and labored. Delirium is frequently present, often of a violent kind, but differing from the delirium of typhoid and typhus fever in that the patient can easily be aroused so as to answer questions intelligently. There may be, at some stage of the affection, an eruption of a dark-red or purplish hue, of a hæmic character, not raised but apparently imbedded in the substance of the skin. This eruption is by no means a constant phenomenon, nor is it confined to any particular portion of the body. There is usually much nervous agitation, manifested by a constant restlessness and jactitation. The muscles of the neck become rigid and contracted, drawing the head backward to almost a right angle with the thorax; this, although not a constant symptom, is mostly seen, or at least a tendency to this condition is noticed, at some period of the disease. There may be also tetanic and clonic spasms. The action of the heart is irregular and tumultuous, so as often to simulate valvular disease of that organ. An inflammatory condition of the iris, or of the synovial membrane of the larger joints is often an accompaniment. Such are among the more prominent and constant symptoms. But there is a considerable diversity in these manifestations during the progress of the disease, whether towards a favorable or fatal result; in no individual case can it be expected that all, or even a majority, of those above enumerated will be present.

The *duration* of the disease is very uncertain. It may last less than twelve hours, or it may extend, with its complications and sequelæ, to as many weeks, or, perhaps months; the greater number of fatal cases terminate on or before the seventh day. Cases are on record in which death has occurred within two or three hours from the time of seizure.

No *age* is exempt; nor would there seem to be any preference of *sex*. Children are, perhaps, more commonly subjects of

the disease. Statistics show that more cases occur under than over the age of ten years.

The *mortality* is very great, averaging in many well-marked epidemics of which we have record fully 67 per cent. In the visitation at Newbern, before alluded to, the mortality of all the recorded cases was 73 per cent.; in the city of New York, in 1872, it was 75 per cent.; in the epidemic that occurred in this State, in 1866, it was 61 per cent.

The *prognosis* must be regarded as doubtful from the first; of no disease is it more hazardous to base upon existing favorable or unfavorable symptoms a positive prediction as to the result. Convalescence is usually slow and relapses not infrequent.

As to the *season of the year* when epidemics of this affection are most apt to prevail, not much that is satisfactory can be learned. Dr. Simon has stated that, of 182 European epidemics, 24 were in October and November, 46 in December and January, 48 in February and March, 30 in April and May, 24 in June and July, and 10 in August and September. Dr. Clymer, who has collected the statistics of many epidemics, says that, in Sweden, of 417 local outbreaks, 311 were in winter and 106 in summer; that, of epidemics in Europe and the United States, noted by Hirsch, 33 prevailed in winter, 24 in winter and spring, 11 in spring, one in spring and summer, two in summer, one in summer and autumn, one in autumn, one in autumn and winter, three in autumn, winter and spring, and six throughout the whole year. Pleiffer says "it prefers winter, soldiers and children."

It would be out of place here to enter largely into the consideration of the *nature and pathology* of the disease. Suffice it to say that the weight of evidence is in favor of placing it in the category of those diseases which are engendered by the existence of a morbid poison acting primarily upon the vital fluid, and secondarily affecting more especially the meninges of the base of the brain and spinal cord, where, upon dissection, its material lesions can most often be found.

The etiology, or *cause of the disease*, is still involved in doubt. It will be our aim to consider, with minuteness and impartiality, the mass of evidence collected from the many

intelligent observers of the present epidemic, and to deduce, if we can, something that may prove of use in the prevention or management of future visitations of a like nature.

Before entering upon a discussion of the existing epidemic, let us glance at the past history of the affection within the limits of our own State. The first reliable record of it, as seen in the epidemic form in Massachusetts, dates back to 1806, when it appeared in the town of Medfield. Nine cases occurred in that town, all of which proved fatal. This was in the month of March. From that time until 1816 it appeared, at intervals, at various points within the State, and was more or less epidemic in its character. It prevailed quite extensively in 1810. In that year a most interesting report upon this then mysterious and obscure affection was drawn up and published by Drs. James Jackson and John C. Warren. It first appeared, as stated in that report, in the town of Dana, about the beginning of the year, "but not in any considerable number of instances until the cold weather of the middle of January." In the latter part of February it was heard of at Petersham, and at Barre, Oakham, Rutland, Paxton, Hardwick, New Braintree, Brookfield, Spencer, Sturbridge, Winchendon, Athol, Gerry, Leicester and Worcester, in the course of the month of March, "mostly about the third week in that month." It will be seen that all the above-named towns are in the county of Worcester. It was seen at Cambridgeport in the latter part of March, and at Lancaster in April. In the course of April and May a few cases occurred at Boston, and again in the counties of Worcester and Middlesex. During May it presented itself in Springfield, and had not subsided in the second week in June.* We hear little or nothing more of the disease till 1849, when Dr. Joseph Sargent, of Worcester, called the attention of the profession to its existence in the towns of Millbury and Sutton during the month of March of that year. Not many cases were seen, however, and if the disease could then be called epidemic at all, it was limited both in quantity and extent. Dr. S., in this memoir, first suggested the analogy of the

* See Report of the Committee of the Mass. Med. Soc'y, May, 1866, Luther Parks, M.D., Chairman.

disease with the so-called "spotted fever" of a former day.* It appeared again, to a limited extent, in April, 1857, in the town of Becket, in Berkshire County. Dr. Jackson stated that he had occasionally met with sporadic (isolated) cases of the disease in later years, or since the epidemic of 1806-16.† Since about the time of the outbreak of the disease among our soldiers during the war, it has made its appearance at various points in this State. Five cases came under the observation of the writer, in the Boston City Hospital, in 1865-6. Some of these cases originated in the hospital. Dr. Page saw a considerable number of cases, near the close of the war, at Gallop's Island, a military post in Boston Harbor.

The report of the committee from the Massachusetts Medical Society, in 1866, covers all the cases which could be collected in the State from 1857 to 1865 inclusive,—280 in all. These were distributed over the different years as follows :—

In 1857 there were	.	.	.	3 cases.
1858 " "	.	.	.	27 "
1859 " "	.	.	.	3 "
1861 " "	.	.	.	5 "
1862 " "	.	.	.	5 "
1863 " "	.	.	.	7 "
1864 " "	.	.	.	88 "
1865 " "	.	.	.	116 "
Years not designated,	.	.	.	26 "
				<hr/>
Making a total of	.	.	.	280 cases.

From the above it appears that instances of the disease have occurred in this State in each year from 1857 to 1865, inclusive, with the exception of 1860. Doubtless a considerable number of cases might have been chronicled in 1866, but the report did not include the record of that year, other than the mention of seven cases in Brookline, in January.

* Records of the Boston Society for Medical Improvement, 1849.

† Extract of a letter from the late Dr. James Jackson to Dr. L. Parks, in 1866. See report of the Committee of the Massachusetts Medical Society for that year.

We are not able to find any reliable account of the number of cases of this affection which have occurred from 1866 to 1871, inclusive. Neither the state or city registration reports render much assistance in this investigation. In the former, the nosological term, cerebro-spinal meningitis, does not appear. We have the right to infer, however, from an actual knowledge of the existence of the disease, to a greater or less extent, in these years, that it may be embraced within the term "cephalitis," under which all the inflammatory affections of the brain and its coverings seem to have been classed. Among the causes of death for the years below stated, the number attributed to "cephalitis" stands as follows:—

In 1863,	.	.	.	.	.	.	524
1864,	.	.	.	.	.	.	728
1865,	.	.	.	.	.	.	669
1866,	.	.	.	.	.	.	595
1867,	.	.	.	.	.	.	525
1868,	.	.	.	.	.	.	577
1869,	.	.	.	.	.	.	572
1870,	.	.	.	.	.	.	601
1871,	.	.	.	.	.	.	620

We would call attention to the fact that in the years 1864 and 1865 the disease was known to be epidemic in many portions of the State; and the greater number of deaths attributed to "cephalitis" in these epidemic years tends to confirm our opinion that the disease existed, and was reported under the above title. In 1872 it appears for the first time in the state nosological records under its true name, 157 deaths being returned as occurring from cerebro-spinal meningitis, 16 from spotted fever, and two from black fever, all which were supposed to be cases of the affection now under consideration. In his annual report for 1872, the city registrar states that the whole number of deaths in Boston from this cause in that year was 60, of which number 34 were males and 26 were females. He further says that in 1867, when this disease was first distinctively reported to him, under its present name, there were seven

deaths; in 1868, eight; in 1869, seven; in 1870, five; and in 1871, three.*

During the early months of the present year it became evident that the disease had again assumed an epidemic form, and was prevailing to an unusual extent, in the eastern portions of the State especially. In the month of May a notice was inserted in the Boston Medical and Surgical Journal, calling the attention of physicians to this fact, and asking their aid and co-operation in collecting statistics. Subsequently a circular was issued by the Secretary of the State Board of Health, and distributed to his regular correspondents throughout the State. This circular contained the following questions:—

1. How many cases of this disease have come within your knowledge or observation within the present year?

(If no cases have been observed, please give a negative reply.)

2. State the sex, nationality, age, and occupation of the patients.

3. Character of the attack, whether sudden or otherwise.

* The distribution of deaths attributed to this disease in 1872 will appear from the following table.

COUNTY.	Town.	Deaths.	COUNTY.	Town.	Deaths.
Barnstable, .	Orleans, . .	1	Plymouth, .	Abington, . .	1
	Adams, . .	5		Mattapoisett, .	1
Berkshire, .	Gt. Barrington, .	2	Suffolk, . .	Boston, . .	63
	Lenox, . .	1		Chelsea, . .	1
	Williamstown, .	1		Ashburnham, .	1
Bristol, . .	Fall River, . .	2 ¹		Berlin, . .	1
	Amesbury, . .	2		Clinton, . .	1
Essex, . .	Danvers, . .	2		Grafton, . .	4
	Essex, . .	1		Hardwick, . .	1
	Salem, . .	1		Holden, . .	1
	Topsfield, . .	1		Hubbardston, .	1
Franklin, .	Warwick, . .	1		Lancaster, . .	1
	Chicopee, . .	1		Mendon, . .	2
Hampden, .	Holyoke, . .	3		Milford, . .	5
	Springfield, . .	5	Worcester, .	Northbridge, .	1
	Enfield, . .	1		N. Brookfield, .	1
Hampshire, .	Hadley, . .	1		Oxford, . .	1
	Southampton, .	1		Royalston, . .	2
	Littleton, . .	2		Sontheboro', .	2
	Lowell, . .	1		Sterling, . .	1
Middlesex, .	Marlborough, .	18		Sutton, . .	1
	Melrose, . .	1		Upton, . .	6
	Natick, . .	7		Webster, . .	2
	Somerville, . .	1		Winchendon, .	1
	Tewksbury, . .	1		Worcester, . .	5
	Brookline, . .	2			
Norfolk, . .	Hyde Park, . .	1			175
	Quincy, . .	1			
	West Roxbury, .	1			

¹ Black fever.

4. Stage of the disease when the patient was first seen.
5. The earlier and later symptoms.
6. The duration of the disease.
7. The treatment.
8. The result.
9. The post-mortem developments, when obtained.
10. Name of the attending physician.
11. Has the disease prevailed among *animals*,—horses, cows, hens, etc.? If so, please state the symptoms and pathological appearances when possible.
12. General remarks upon the case, *with especial reference to its supposed origin or cause*. In this connection a detailed account of the locality, hygienic conditions and circumstances of the patient,—his home and home surroundings, living-rooms, cellar, sinks and privies, nature of the soil, drainage, character of the water used for drinking and culinary purposes, etc., etc., is especially desired.

And for the greater convenience of record, when a considerable number of cases had been observed, a tabular form, with headings indicating the desired points of information, was added.

Replies have been received from 199 physicians, representing 77 towns and cities, who have furnished the statistics, more or less complete, of 517 cases of the disease. In this enumeration we have retained only those instances which we believe to be genuine and authentic. The following will serve as examples of these tabular returns received from various parts of the State :—

*TABULAR STATEMENT of Cases of *Cerebro-Spinal Meningitis*

No. of Case.	NAME OF CITY OR TOWN.	Name, Nationality, and Occupation.	Age.	Condition—Easy or otherwise.	Date of Attack.	Onset—Sudden or otherwise.	* No. of Hours or Days ill before Seen.
1	Boston, .	M. L. C., Domestic, Canada.	18	Comfortable.	Mar. 15,	Sudden,	One day.
2	Fitchburg, .	W. F., .	13	Easy, .	May 16,	Sudden,	16 hours.
3	Haverhill, .	Mrs. S., American.	27	Good, .	Apr. 15,	Sudden,	Seen at once.
4	Leominster.	S. W., American.	60	Not destitute, but with limited and gradually diminishing means.	July 28,	Sudden,	16 hours.
5	Worcester, .	G. M., American.	5	Easy, .	Apr. 14.	Sudden,	2 days.

occurring in Massachusetts during the Epidemic of 1873.

SYMPTOMS.

Early.	Advanced.
Vomiting of bilious matter. Severe headache; pain in back, and stiffness of right leg. Delirium at night. Pain of head referred to forehead; and of back in upper cervical and lower dorsal vertebrae, where she is tender on pressure. Slight deafness. Temperature, 102°.	Pain as at first. Delirium at times. Pulse, 72-140; small, weak. Hearing good at times. Temperature, 101°-104°. Patient failed rapidly on fifth day. No convulsions. No eruption.
Vomiting. Pain in head, and general febrile symptoms. Severe pain in back of head and neck. Appetite continued good until a few hours before death.	Rapid pulse, pain in head; stiffness of spine, and tenderness, especially in cervical region. Sank rapidly and died, without premonition, apparently from paralysis of respiratory muscles. At death, pulse at wrist full, strong—130 per minute; heart continued to beat for two or three minutes after respiration had ceased, when the action became slower, feebler, and ceased entirely. I was present at death.
Violent pain in back; spasms. Unconsciousness.	Symptoms continued in modified form for two weeks.
Intense pain in head, with rapid pulse and high fever; dry skin; bilious vomiting, with remissions of pain in head transferred to back, particularly lower part of back. This, at times, intense, with paralysis of bladder for eight days in second and third weeks, requiring use of catheter twice a day; after that the bladder resumed its action.	Paroxysms of pain in head and back gradually subsiding; stiffness of muscles of neck and lower jaw, with difficult deglutition; no appetite; gradual failing of vital powers.
No marked rigor. Pain in head and back of neck; vomiting; convulsions; fever; delirium; retraction of head; tenderness along cervical portion of spine; large herpetic cluster upon back of left hand; no other eruption.	Profound <i>insensibility</i> ; pallor, alternating with flushings of the face; slow, feeble pulse; strabismus, with dilated and insensible pupils; complete hemiplegia of right side, lasting for two weeks; constant jactitation of left arm and leg; great emaciation.

Tabular Statement of Cases of Cerebro-Spinal Meningitis

No. of Case.	Relapses, or Decided Remissions.	Duration, till Convalescence or Death.	Treatment.	Result.
1	Some relief to pain under treatment.	Five days.	Morph. Sulph. at first for pain and restlessness. Second day, Fl. Extract Ergot. m. xx. Potass. Bromid. gr. v. 2d h. Third day, Ergot omitted, and Potass. Br. increased to gr. xx. with Extract Cannabis Ind. gr. $\frac{1}{2}$ 2d h. Fourth day, pain much relieved.	Death.
2	Quite a marked remission after 12 hours.	48 hours from first attack.	First saw the patient at evening; gave morphia until sleep, quiet and refreshing, ensued. Morning found apparent convalescence; pulse 80, and nearly normal. Directed quiet, stimulants to spine with diuretics. At 4, P. M., patient suddenly grew worse, became unconscious, and died at 10, P. M.	Death.
3	Severe relapse May 4th.	Five weeks.	Counterirritation vigorously applied. Bromide Potass. Hyd. chloral. Sulph. Quinæ.	Recovery.
4	None.	7 weeks and 2 days.	At onset emetic—cathartics—then cold to head; counterirritants to spine; blisters to nuchæ, temples, back of ears, &c. Paroxysms of pain subdued by sub-cutaneous injection of morphine—sleep induced by choral. After the acute stage—2 weeks—beef-tea, broth, milk-punch, &c., all the patient would take, which was not much, and only at our earnest solicitation. He gradually sank from exhaustion.	Death.
5	None.	Duration, to complete convalescence, about 3 months. Under treatment, seven weeks.	Early: cold applications to head and spine; evacuation of bowels. Potass. Bromid. ev. 4 hours, and Chloral and Opium p. r. n. Advanced: nourishment, Potass. Iod., Hydrarg. Bichlorid., and as convalescence became established, Iron.	Recovery complete.

occurring in Massachusetts during 1873—Concluded.

Post-Mortem Developments.	Locality — High or Low, Damp or Dry.	Name of Attending Physician.	Remarks, with especial reference to Origin or Supposed Cause.
No autopsy.	Residence not known.	Dr. Abbot.	This was a patient in the Massachusetts General Hospital, where she entered on the second day of her sickness, and remained until her death.
No post-mortem.	House situated on the bank of an artificial reservoir, into which a sewer is drained.	Dr. Jewett.	The home of this patient is at the lowest part of a valley. House stands on the shore of an artificial reservoir, which is used almost daily for a mill; surface of the pond is constantly changing, leaving the bottom frequently exposed to the sun and air. Into this pond several privies and a sewer are emptied. My opinion is, that both the air and drinking-water are poisoned, and that to these sources we may look for cause of the disease.
-	Street well drained. Clay bottom; cellar damp.	Dr. Crowell.	New house with modern conveniences. Tenement on north side. Good family. The street sloped abruptly toward the river, on the south. Surface-drainage good. Pure aqueduct water used.
No autopsy.	Low and damp.	Dr. Field.	I consider the proximate cause to be this—the falling asleep on the ground after a hard day's work. A life of hard work and gradually diminishing pecuniary means may be considered as remote causes. Perhaps the water used by the family, taken from a neighboring pond, may have had something to do in causing the disease.
-	High, dry, sandy soil.	Dr. Gage.	This case was isolated. There were no others in the family or neighborhood. The house was apart from others, upon high ground, and surrounded by trees, and the surroundings appeared to be every way of the most favorable character. Convalescence was very slow. Intellect for a long time very weak, but finally fully restored. Command of lower limbs was very slowly regained. Strabismus continued for three months, but at last entirely disappeared.

The following table will show the towns from which affirmative replies have been received, and the number of cases reported in each, with the population in 1870.

CITIES AND TOWNS.	Population in 1870.	No. of Cases.	CITIES AND TOWNS.	Population in 1870.	No. of Cases.
Abington, . . .	9,308	9	Lowell, . . .	40,928	48
Amherst, . . .	4,035	3	Lynn, . . .	28,233	48
Andover, . . .	4,873	4	Marblehead, . . .	7,703	8
Ashland, . . .	2,186	2	Methuen, . . .	2,959	1
Attleborough, . . .	6,769	1	Mattapoisett, . . .	1,361	1
Belchertown, . . .	2,428	3	Millbury, . . .	4,397	5
Beverly, . . .	6,507	3	Milford, . . .	9,890	9
Boston, . . .	250,526	50	Newburyport, . . .	12,595	2
“ City Hospit’l, . . .	—	16	New Bedford, . . .	21,320	1
“ Mass. Gen. H. . . .	—	2	New Marlborough, . . .	1,855	1
“ Dorch. Dist., . . .	—	2	New Salem, . . .	987	2
“ Roxbury “ . . .	—	7	Newton, . . .	12,825	4
		—77	N. Bridgewater, . . .	8,007	4
Braintree, . . .	3,948	7	Northampton, . . .	10,160	3
Bradford, . . .	2,014	1	North Brookfield, . . .	3,343	3
Brighton, . . .	4,967	6	Palmer, . . .	3,631	1
Brookfield, . . .	2,527	2	Peabody, . . .	7,343	3
Brookline, . . .	6,650	3	Prescott, . . .	541	1
Cambridge, . . .	39,634	17	“ North, . . .	—	3
“ East, . . .	—	1			— 4
“ North, . . .	—	1	Quincy (Point), . . .	7,442	1
		—19	West Brookfield, . . .	1,842	1
Cambridgeport, . . .	—	7	West Roxbury, . . .	8,683	2
Charlestown, . . .	28,323	28	Salem, . . .	24,117	5
Chelsea, . . .	18,547	11	Salisbury, . . .	3,776	3
Chicopee, . . .	9,607	10	Sandwich, . . .	3,694	1
Clinton, . . .	5,429	2	Saugus, . . .	2,247	1
Dedham, . . .	7,342	8	Shrewsbury, . . .	1,610	2
Dudley, . . .	2,388	1	Somerville, . . .	14,685	6
Everett, . . .	2,220	7	South Hadley, . . .	2,840	1
Fall River, . . .	26,766	6	Springfield, . . .	26,703	12
Fitchburg, . . .	11,260	2	Stoughton, . . .	4,914	7
Great Barrington, . . .	4,320	1	Swampscott, . . .	1,846	2
Hadley, . . .	2,301	1	Tyngsborough, . . .	629	3
Haverhill, . . .	13,092	18	Watertown, . . .	4,320	5
Hingham, . . .	4,422	2	Webster, . . .	4,763	5
Holyoke, . . .	10,733	5	Westfield, . . .	6,519	1
Hubbardston, . . .	1,654	2	Weymouth, . . .	9,010	2
Lawrence, . . .	28,921	15	Winchester, . . .	2,645	1
Leicester, . . .	2,768	2	Winchendon, . . .	3,398	6
Leominster, . . .	3,894	20	Woburn, . . .	8,560	4
Leverett, . . .	877	1	Worcester, . . .	41,105	7
Lexington, . . .	2,277	2			

The following are the towns from which negative replies have been received:—

Ashby, Barre, Berlin, Billerica, South Boston (Hospital), Bridgewater, Enfield, Essex, Fairhaven, Falmouth, Granby, Halifax, Hopkinton, Hyde Park, Ipswich, Jamaica Plain, Kingston, Longmeadow, Manchester, Marlborough, Montague, Nantucket, North Andover, North Brookfield, Orleans, Plymouth, Reading, Rowe, Sharon, Sherborn, Shirley, Stockbridge, Stoneham, Wakefield, Walpole, Waltham, Ware, Wareham, Wenham, West Boylston, West Springfield and Williamstown.

The period embraced in this investigation covers only the year 1873, and relates mainly to the first ten months of the year, since the time did not allow us to keep the record open longer. Such cases, however, as could be collected in November and December are included in our count.

We do not presume to have presented a full return of all the cases which have occurred within the limits of the State during this period. A considerable number of physicians, to whom circulars were sent, failed to reply either affirmatively or negatively. In many instances it was stated that the disease existed, but "no notes of the cases had been preserved." In many instances also the record of such as were given was insufficient to warrant an opinion of the true character of the affection. It will be seen, however, that with all these limitations the aggregate of cases far exceeds the number adduced in any former epidemic of which we have record in the State.

In elucidation of the character of the present epidemic, and as having a possible bearing upon its origin or supposed cause, we make the following extracts from the tabular returns and medical correspondence called forth by the circulars:—

Abington.—Dr. Gleason reports nine cases, the location of which is said to be "good" in six, "low or damp" in three. Two of these patients, aged 7 and 11, were pupils in a day-school.

Amherst.—Three cases reported. In two there was "no appreciable cause. Hygienic conditions excellent in every respect." In one, "hygienic condition very unhealthy: the house low and damp, situated in a hollow; the yard, at the time, filled with the wash of the surrounding nastiness; and the drinking-water coming from a well in the middle of the yard." Dr. D. B. N. Fish writes from this place as follows:—"In the spring many diseases took

on a condition of great depression, with slow pulse, much restlessness, sighing, respiration, etc., resembling that of epidemic cerebro-spinal meningitis, of which disease there were several cases in this vicinity at that time."

Ashland.—"Two cases reported. Cause not appreciable. Sanitary surroundings of the patients good: the soil a deep, heavy, sandy loam with a gravelly subsoil; natural drainage good; the cellars a little damp."

Andover.—Dr. Kimball reports four cases. In one case the location was dry; in two cases it was dry, but near a pond or running stream; in one it was "rather damp." Nothing definite is stated as to origin or supposed cause; two of the cases followed exposure to wet and cold after very violent exercise.

Attleborough.—Dr. Sanford reports a single case. "Patient was robust, active and athletic. Of origin or supposed cause," he says, "nothing can be stated."

Belchertown.—Three cases reported. In two, "locality low, the patients being occupants of an Irish shanty on the bank of a river so swollen at the time as almost to reach the threshold of the house; no conveniences of any kind." In one case the disease supervened upon typhoid fever. This patient "was from a good family, but had been overworked, both physically and mentally,—was away from home at school when seized with the fever, and living in a very damp location."

Beverly.—Three cases are reported by Dr. Haddock. In one instance the locality was high; in two it was low.

Boston.—The records of the city registrar show that 216 deaths were attributed to this disease in 1873. Of this number, 100 were males and 104 females; in 12 the sex was not stated. The first case was recorded on the 11th day of January. I have been able, through the courtesy of Mr. Appolonio, to obtain the dates and fix upon the exact locality of 204 of these reported cases, as will appear in the following table:—

Table showing the DEATHS attributed to Cerebro-Spinal Meningitis in Boston in 1873—Taken from Books of the City Registrar.

Month.	Sex.	STREET AND NUMBER.	Ward.	Month.	Sex.	STREET AND NUMBER.	Ward.
Jan. 1st to Jan. 23d.	F.	9 Oxford Place, .	V.	M.		City Hospital.	
	F.	70 Warren Street, .	XIV.		M.	Franklin Street, .	XVI.
	M.	144 Portland Street, .	IV.		F.	138 Mt. Vernon St., .	VI.
Jan. 24th to Jan. 19, inc.		Not stated.		F.		39 Ellery Street, .	XII.
	M.	12 Hollis Place, .	VIII.		M.	Bowdoin Sq., .	XVI.
	M.	44 Parkman St., .	III.		F.	45 Athens Street, .	VII.
Feb. 1, inc.	F.	Tremont Street, .	XV.	M.		7 Travers Court, .	XI.
	M.	Deer Island.			F.	100 Hudson Street, .	VIII.
	M.	35 Adams Street, .	XIII.		F.	Fellows Street, .	XIII.
	M.	22 Liverpool St., .	I.	F.		Not stated.	
	F.	11 Franks Street, .	IV.		M.	23 Maverick Sq., .	I.
					F.	Dorchester Av., .	XVI.
	M.	22 Ferry Street, .	II.	F.		11 Riverside St., .	XV.
	F.	18 Norfolk Place, .	V.		F.	15 Gouch Street, .	IV.
	F.	57 Anderson St., .	VI.		M.	42 Tileston Street, .	II.
	F.	Fulton Street, .	XVI.	M.		Deer Island.	
	M.	17 Rochester St., .	VII.		F.	3 Wadleigh Pl., .	XII.
	M.	40 Billerica Street, .	III.		F.	693 Washington St., .	VIII.
	M.	17 Maverick St., .	I.	F.		Tremont House, .	IV.
	F.	65 Brighton St., .	III.		M.	3 Rutland Place, .	XI.
	M.	90 Fifth Street, .	VII.		F.	1094 Shawmut Av., .	XIV.
	F.	100 Kendall Street, .	XI.	M.		Broadway Ct., .	VII.
	M.	153 Saratoga Street, .	I.		F.	47 Oswego Street, .	VII.
	M.	98 Brookline St., .	X.		F.	183 Endicott Street, .	II.
	F.	36 Lampson St., .	IX.	F.		352 Third Street, .	XII.
	F.	57 Williams St., .	XIV.		F.	42 Yeoman Street, .	XIII.
	M.	234 Hanover St., .	II.		M.	31 North Square, .	II.
	M.	61 Bower Street, .	XIV.	F.		46 Piedmont St., .	IX.
	M.	453 Shawmut Av., .	XI.		F.	2059 Washington St., .	XV.
	M.	Rogers Av., .	XV.		M.	239 Trenton Street, .	I.
	M.	199 Silver Street, .	VII.	M.		122 Sumner Street, .	I.
		Not stated.			M.	10 Bridge Street, .	III.
	M.	Mass. Genl. H.			M.	31 Billerica Street, .	III.
	F.	10 Genessee St., .	VII.	M.		36 Cottage Street, .	I.
	F.	6 Lark Street, .	XII.		F.	39 E. Dedham St., .	X.
	F.	2 Clifford Place, .	II.		M.	Harrison Sq., .	XVI.
	F.	29 Cove Place, .	VII.	F.		59 Endicott Street, .	II.
	M.	160 Chelsea Street, .	I.		M.	4 Buttrick Place, .	II.
	F.	91 Charter Street, .	II.		M.	16 B Street, .	VII.
	M.	89 Sixth Street, .	XII.	M.		5 Maverick St., .	I.
	F.	58 Baxter Street, .	VII.		F.	City Hospital.	
	F.	Mass. Genl. H.			M.	3 Watts Court, .	XII.
	M.	Heath Street, .	XV.	M.		9 Meander Street, .	X.
	F.	124 Mt. Vernon St., .	VI.		F.	Morni Court, .	XII.
	M.	6 Lark Street, .	XII.		M.	City Hospital.	
	M.	18 Minot Street, .	III.	F.		Mass. Hotel, .	II.
	M.	19 Margaret Street, .	II.		M.	41 Haynes Street, .	I.
	F.	City Hospital.			F.	120 Havre Street, .	I.
	F.	3 Irving Place, .	VI.	F.		2 Carver Place, .	VIII.
	F.	45 Sharon Street, .	XI.		F.	200 Marion Street, .	I.
	F.	987 Tremont St., .	XV.		F.	141 Eighth Street, .	XII.
	F.	144 Third Street, .	VII.	M.		20 Havre Street, .	I.
	M.	21 Hanson Street, .	X.		M.	48 Williams Street, .	XIV.
	F.	Shamrock St., .	XVI.		M.	Neponset Av., .	XVI.
	M.	City Hospital.		M.		145 Harrison Av., .	VIII.
	F.	320 Sumner Street, .	I.		M.	City Hospital.	
	F.	6 Gold Street, .	VII.		M.	39 Gooch Street, .	IV.
	M.	28 Yeoman St., .	XIII.	F.		10 Cottage Place, .	XV.
		Not stated.			F.	581 Shawmut Av., .	XI.
					F.	5 K Street, .	XII.

DEATHS by Cerebro-Spinal Meningitis—Concluded.

Month.	Sex.	STREET AND NUMBER.	Ward.	Month.	Sex.	STREET AND NUMBER.	Ward.
April 15th to May 13th, inclusive— <i>Con.</i>				June 15, inc.			
	M.	26 Grenville Street,	IX.		M.	47 Vale Street,	XV.
	F.	12 Beacon Street,	IV.		M.	35 Rochester St.,	VII.
	M.	270 Athens Street,	VII.		F.	119 Charlestown St.,	II.
	F.	3 Texas Court,	XV.		M.	15 Bennet Street,	II.
	M.	49 Cedar Street,	XVI.		F.	635 Harrison Av.,	X.
	M.	4 Hope Street,	III.		M.	3 Meridian Place,	I.
	F.	26 Traverse Street,	IV.		M.	7 Quincy Street,	XIV.
	F.	101 Norfolk Av.,	XIII.		M.	17 Dale Avenue,	XV.
	M.	976 Harrison Av.,	XIII.		F.	126 Broadway,	VII.
	F.	986 Harrison Av.,	X.		M.	14 Burroughs St.,	VIII.
	M.	249 Shawmut Av.,	X.		M.	City Hospital.	
	M.	609 Harrison Av.,	X.		F.	980 Harrison Av.,	XIII.
	M.	246 Shawmut Av.,	X.		F.	2 Utica Place,	VII.
	F.	284 Federal Street,	V.			Not stated.	
	M.	90 Fifth Street,	VII.	June 16 to July 15, inc.			
	M.	15 Clark Street,	II.				
	F.	Rockingham Pl.,	XIV.		M.	Breed's Island,	I.
	F.	Swett Street,	XIII.		F.	11 Stillman Street,	II.
	F.	291 Fourth Street,	VII.		F.	28 King Street,	XV.
	F.	27 Billerica Street,	III.		F.	238 Harrison Av.,	VIII.
	M.	45 Sharon Street,	XI.		M.	139 Hampden St.,	XIII.
	M.	5 Saxon Court,	I.			Not stated.	
	M.	5 River Street,	VI.		M.	154 Bremen Street,	I.
	F.	37 Merrimack St.,	IV.	July 16 to Aug. 6.			
	F.	49 Pitts Street,	IV.				
	M.	237 Federal Street,	V.		M.	City Hospital.	
	M.	396 Harrison Av.,	VII.		F.	40 Webster Av.,	II.
	F.	10 Bennet Avenue,	II.		M.	525 Chelsea Street,	I.
					F.	1102 Tremont Street,	XIV.
	F.	54 Chadwick St.,	XIII.		F.	20 Seneca Street,	VII.
	F.	Prince Street,	II.		F.	59 Dove Street,	XII.
	M.	11 Malden Street,	X.		F.	70 Charter Street,	II.
	F.	7 Tremont Place,	XV.	Aug. 6 to 29.			
	F.	St. Ann's Inf. Assn.,	XII.				
	F.	4 Percival Street,	I.				
	F.	Forest Hill Av.,	XVI.		M.	42 Snowhill Street,	II.
	M.	5 Myrtle Place,	XIV.			Not stated.	
	F.	30 Allen Street,	III.		M.	243 Federal Street,	V.
	F.	1494 Washington St.,	XI.		M.	City Hospital.	
	M.	194 Prince Street,	II.	Aug. 29 to Sept. 26.			
	F.	374 Meridian Street,	I.				
	F.	41 N. Margin St.,	II.		M.	70 Nashua Street,	III.
	F.	2 Vincent Court,	VIII.		M.	1981 Washington St.,	XIV.
	F.	98 Revere Street,	VI.		F.	16 Simmons Street,	XV.
	M.	40 Union Park,	X.		F.	63 Albany Street,	VIII.
	M.	250 Harrison Av.,	VIII.	Sept. 26 to Oct. 23.			
	F.	111 Worcester St.,	XI.				
	F.	45 Warren Street,	XIII.				
		Not stated.					
	F.	74 Fifth Street,	VII.		M.	60 Cabot Street,	XV.
	F.	21 Meander Street,	X.		F.	8 Lothrop Place,	II.
	M.	183 Friend Street,	IV.	Oct. 23 to Oct. 27.			
	M.	372 Hanover Street,	II.				
May 14 to June 16, inclusive.							
					M.	63 Athens Street,	VII.
					F.	102 Portland Street,	IV.
					F.	7 Holden Place,	VI.
					F.	91 Chelsea Street,	I.

The percentage of Deaths in each Ward may be shown by the following Table.

WARD.	Population in 1870.	Deaths.	Ratio per thousand.	WARD.	Population in 1870.	Deaths.	Ratio per thousand.
XIII., . . .	8,536	11	1.288+	XI., . . .	14,617	9	.616—
II., . . .	24,912	27	1.083+	XII., . . .	19,880	12	.604—
IV., . . .	10,216	11	1.077—	VI., . . .	11,792	7	.594—
XV., . . .	14,851	14	.942+	V., . . .	14,166	5	.353—
X., . . .	13,097	12	.916+	IX., . . .	14,142	3	.212+
XIV., . . .	11,385	10	.878+	Deer Island,	1,660	2	—
I., . . .	23,824	20	.839+	City Hospital,	—	9	—
VIII., . . .	11,278	9	.798+	Mass. Genl. H.,	—	2	—
VII., . . .	28,921	22	.761—	Not stated,	—	8	—
XVI., . . .	12,259	9	.734+				
III., . . .	14,990	10	.666+	Total, . . .	250,526	212	—

It may be proper to give in this connection the general locality and extent of the wards which, according to this table, have furnished the largest ratio of deaths per thousand of inhabitants, in order, as follows, viz.: *Ward XIII.*—By inspecting a recent map of the city, we shall see that this ward is situated in the south-easterly part of the old city proper, spreading out along the waters of the South Bay and intersected with tidal streams. It comprises the "Swett Street District," lies low, and has for the most part no proper drainage. The raising of a considerable portion of this territory is now being mooted by the city authorities. The contemplated route for the extension of East Chester Park to Dorchester nearly bisects this ward. *Ward II* comprises a segment of the North End, so called, the oldest part of the city; its semi-lunar outline bordering upon the Charles River and the harbor. Many portions of this ward have a densely crowded population. *Ward IV* is centrally situated, occupying very nearly a circle whose centre is in Scollay Square. It includes Portland Street, with the numerous courts and alleys adjacent, which can hardly be said to revel in favorable hygienic surroundings; eastward it reaches to the harbor and includes some of the most active business parts of the city. *Ward XV* is included in the extensive and sparsely settled district in the south-westerly part of the city. It lies low, and is in considerable part a marsh. It is largely intersected by tidal inlets. *Ward X* extends from

the South Bay, by which it is bounded for a considerable part of its extent on the east, to Warren Avenue and the Providence Railroad on the west. Washington Street, which formerly connected Boston with Roxbury as a narrow neck, passes through it lengthwise and nearly midway with made lands on either side. *Ward XIV* comprises the picturesque and elevated portion of the city—Roxbury Highlands, formerly so called—and extends in a somewhat narrow strip northerly as far as Tremont Street. *Ward I* comprises the whole of East Boston and the islands in the harbor, and is sometimes called the "Island Ward." *Ward VIII* is small in extent, stretching from the Common eastward to Ward VII. It is bounded by Albany Street on the east, and is intersected by Harrison Avenue, Washington and Tremont Streets.

Beginning now with those wards which are said to have furnished the least number of victims in proportion to their population :—*Ward IX* is situated between the Common and Public Garden and the remotest portions of the Back Bay lands in the one direction, and between Commonwealth Avenue and Ward X in the other. It is largely bottomed on made lands, but lately reclaimed from the sea, and comprises some of the finest streets of the city. It embraces also the recently raised Church Street District. The artificially made portion of this ward was originally a dry gravelly bank in Newton. *Ward V* extends from the Common eastward to the harbor, and includes the greater part of the *burnt district*, so called. *Ward VI* covers the more elevated part of the city north of the Common, extending thence along the Charles River to Brookline. *Ward XII* comprises the greater part of the peninsular of South Boston. *Ward XI* is similarly situated with Ward X, adjoining it upon the south. Chester Park, and Franklin and Blackstone Squares are in this ward. *Ward III* is bounded by Cambridge Street on the south, and extends along the borders of the Charles River as far as Warren Bridge. Most of the northern and eastern railway freight and passenger depots are in this ward.

It is not possible to predicate upon the meagre skeleton of facts here given, any positive opinion as to the conditions

which are most likely to give rise to the disease. This can only be done by a patient investigation of the premises in each individual case, and it offers an interesting field for future research.

Dr. S. L. Abbot has given a careful *résumé* of eleven cases which came under his observation. In three cases the hygienic conditions of residence were unknown; in three cases they were pronounced "good"; four cases occurred in narrow and crowded streets or courts; in one case the location was "as bad as could be,—low and damp, within fifty feet of the marsh on Parker Street, and quite near the large open sewer of that district; in addition to these appointments a cow-yard for the accommodation of a dozen cows adjoined the house on the east." In regard to one of the cases referred to above as living in a narrow and crowded street, he says: "A cess-pool in the yard had been full to overflowing for a year or more, and at full tide there was a foul stench in the house daily. The nuisance was rectified on complaint to the Board of Health, who discovered that the privy also overflowed into the drain. A case of cerebro-spinal meningitis was said to have occurred in the same house a few weeks previously." And of another case in the same category, he says: "The place is so shut in as to be wanting in good ventilation, and has stables for cart-horses in the rear."

Sixteen cases are reported, mostly in the months of March, April and May, from the Boston City Hospital, of which nine died and six recovered. Careful autopsies were made in five cases, showing the usual characteristic manifestations of congestion and effusion about the base of the brain and medulla oblongata, extending sometimes a considerable distance down the cord. No opinion is expressed as to the causation of the disease in these places.

Dr. Read furnishes the statistics of twelve cases which occurred in his private practice. This series of cases is especially interesting as presenting eleven recoveries and one death. Dr. Read attributes his great success to the administration of a combination of ergotine and extract of belladonna in proportion of one grain of the former to one-tenth of a grain of the latter for adults, which dose was administered every three or four hours during the acute stage of the dis-

ease, conjoined with other local and general remedies as symptoms seemed to demand. We understand that Dr. Read intends to give to the profession a *résumé* of all the cases which have come under his observation in which these remedies have been tried, and we therefore forbear to express any opinion on the subject here. Dr. R. makes a particular point of the irregularity of the heart's action in the diagnosis of this disease. In one case he speaks as follows: "The peculiarity most noticeable was the persistent irregularity of the pulse, kept up till after the patient became convalescent, and re-appearing on the least overexertion." Of another case he says: "The pulse was peculiar, consisting of one strong beat, then several feeble, ineffectual beats,—as if a clock should tick once and then the pendulum should swing several times without completing the ticks,—then go regularly for a while, and repeat the process indefinitely."

Dr. Ayer reports four cases, three of which were negroes. He says: "I consider the disease to be epidemic, and can form no conjecture as to its origin and cause."

Dr. Lyman says: "It is impossible, in my experience, to trace the disease to any supposed cause."

Dr. Morland, remarking upon the single case which came under his observation, says: "The previous health of the patient had been delicate; she had suffered from a change of former better circumstances, had endured much care and anxiety, been indifferently nourished and irregular in the times of taking food; she had a lodging-room at the top of the house, dry and well ventilated."

Two cases are reported by Dr. Fitz. Of one he says: "Patient lived in an old house; the nature of soil such that thorough drainage might be questioned; house not opened to sun and light." Of the other he says: "House recently remodelled, soil excellent, drainage good, plenty of sun and fresh air." Dr. Fifield reports three cases, about which he says: "They all lived in unhealthy localities, and the cause seemed to be exposure to cold and wet." Dr. J. Homans reports one case, of which he remarks: "The sanitary conditions of the locality showed nothing remarkable." Dr. Ellis reports a case, of which he says: "No assignable cause; patient was healthy and living under the best hygienic con-

ditions." Dr. C. D. Homans says, of two cases reported by him: "One was a robust boy; the other an ambitious girl, but not robust, who had generally resided in the country. She had studied hard." Dr. Palmer reports three cases, in one of which he attributes the immediate cause to "anxiety in consequence of the sickness of her husband, and damp feet and clothing from exposure to snow." Dr. Fisher writes, under date of July 16, as follows: "The late epidemic was mild in comparison with the one I witnessed at Newbern, I think. Deaths, so far as I can learn, were less sudden and frequent, and the signs of disorganization of the blood less prominent." Dr. Gavin reports seven cases. "In none of those cases," he writes, "have I been able to detect a want of proper hygienic or sanitary conditions. The disease was singularly tedious in its course,—twelve or more weeks passing by with very little improvement in the symptoms. In only one of my cases did any eruption show itself, and then it was of the vesicular order." Two cases are reported by Dr. Swan. Of one he says: "Locality low, damp and filthy. Patient's mother is said to have died with similar symptoms, in the same house, four months previously." Dr. E. T. Williams presents a group of sixteen cases, which he regards as genuine specimens of the disease, and an analysis of which seems to him to favor the existence of contagion as a means of extension.

It will be seen that a considerable number of cases came under treatment in the hospitals, the origin of which, as is mostly the fact with severe diseases brought into hospital, could not be satisfactorily traced.

Braintree.—Dr. Torrey reports seven cases, five of which occurred in one family, all being children, varying in age from four months to eleven years. The locality is said to be damp and near a pond. "All these patients were of Irish descent, living in a low, damp place, their houses filthy, with nine or ten persons crowded into two rooms."

Brighton.—Of six cases reported, one, that of a stone-cutter, aged twenty-one years, "followed exhaustive labor at his trade during the very warm days of June." In another, "the surroundings were most unhealthy,—the patient being sick in the kitchen, on four chairs used as a bed." Another, a girl of eleven, was a close student, as well as a brilliant one."

Brookline.—Two cases reported. In one, "could be traced to no cause except exhausting work as book-keeper." In the other, "could be traced only to a crowded household, if that can be considered a cause." Dr. Salisbury has

detailed a single case, which manifestly falls into the category of the disease in question. He states, however, that he has had twelve or fifteen cases within a period of two months, varying in severity, and all going through their course without alarming symptoms, but with characteristics so similar in kind with the case he has reported, as to leave in his own mind no doubt as to their identity. In addition to these, three undoubted and fatal cases have occurred in his practice.

Cambridge.—Dr. Wellington speaks of the disease as occurring, for the most part, without premonitory symptoms, coming on suddenly with chills, vomiting, violent headache, soon followed with pain at the nuchæ and spine, etc., etc. He noticed in some of his cases a marked and sudden variation in the temperature of the surface, changing two or three degrees in the space of twenty-four hours or less, and that, for the most part, the temperature was from one to two degrees higher at night than in the morning. The pulse varied from 90 to 120. There was usually moisture rather than dryness of the skin, great sensitiveness to the touch, and marked exhaustion from the first. Stiffness of the muscles of the neck was common, opisthotonos not unusual. In a majority of his cases the decubitus was on the side. He notes a busy, talking delirium, the patient's mind running upon his occupations. This delirium was superficial, so to speak, the patient being easily roused to answer questions logically. He marked this peculiarity in even his worst cases. Dr. W. had noticed, during the spring months, that other diseases simulated the prevailing epidemic in their early symptoms. He had a case of acute rheumatism which began in this way. "I can say but little with regard to origin or supposed cause. In one case the surroundings were all favorable. In two cases the patients were in easy circumstances and, in the main, well provided for; but the cellars were damp and drainage was defective." In Dr. Webber's three cases, the locality was "low and dry, with a sandy soil," in one case; "low and damp in another;" "high and damp, with clayey soil, but excellent drainage," in the third. In six cases reported by Dr. Hildreth, it was "low and damp" in three cases; "moderately favorable" in the others. In Dr. Hooker's "twelve or fifteen cases" no origin or cause of the disease could be traced. The most aggravated cases were those living in healthy localities, patients cleanly, occupations light. In Dr. Massey's eleven cases, the ground was "low and underdrained" in six cases; filled land and badly drained in one case; healthy location in four cases.

Charlestown.—The epidemic was rife here during the early months of the year. Dr. Forster reports as follows: "In its attack the disease was sudden and severe, and attended with a large mortality. There was great variety in the modes of treatment adopted, as well as great uncertainty as to the result." He alludes to the existence of spurious or abortive cases of the disease,—cases having all the early symptoms of the genuine affection, oftentimes very marked, but lasting two or three days and then subsiding.

Chelsea.—Dr. Wheeler reports having observed many undoubted cases of the disease in his own practice and in that of his brother physicians. "The disease commonly came on suddenly with chills, severe headache and pain in the back, especially along the nuchæ, with sometimes symptoms of a violent cold, occasionally with vomiting, and almost invariably with great nervous excitement. There was generally great sensitiveness of the surface, restlessness and jactitation;—spots not constant, though frequently seen.

In most of the cases there was retraction of the cervical muscles, causing the head to be thrown backward." He had noticed in two or three cases an excessive tenderness of the posterior muscles of the legs and thighs, which preceded the retraction of the head and neck. He had seen one post-mortem examination, which showed extravasation of lymph about the base of the brain and spinal cord. He had remarked the existence of what he calls "spurious cases" of the disease in several instances, in his own practice and that of others, *i. e.*, instances where the patient was attacked suddenly and violently with chills, headache, pain in the back and joints, and great nervous disturbance, giving reason to fear the access of this disease—all symptoms, however, subsiding and merging, after a few days, into a somewhat slow convalescence and perfect recovery. He recalls two such instances in one family, a father and son, who were attacked about the same time with the symptoms above stated, conjoined with vomiting, feverishness, and severe pain in the head and back, and accompanied in each case with pain along the line of the fibula, giving promise of an attack of acute rheumatism. Both patients were confined to their bed, had distinct remissions every morning and exacerbations in the afternoon. After a period of from four to six days, such cases generally cleared up or resolved themselves into an attack of bronchitis, catarrh, or some other mild affection. At a later date he says: "The disease suddenly subsided as the dry weather of early summer came in. I think many of the cases were traceable to bad location, cesspools, privy-vaults of cellars poorly ventilated, or some deficient drainage about the premises."

Chicopee.—Dr. Abell makes the following statement: "From my observation of the cases which occurred in my own practice and elsewhere, I came to regard the disease as more like a rheumatic inflammation of the meninges of the brain and spinal envelope than anything else; that the proximate cause is atmospheric; that the exciting causes may be various, as a blow on the head, exposure to the sun's rays, cerebral excitement from fear, over-exertion at study, work, etc.; and I could not but think that the pestilential vapors arising from foul pools in the immediate vicinity of many of the cases had a decided influence." In another communication he writes as follows: "I have had some thirteen or fourteen cases of the disease. They all had many symptoms in common, while each had some peculiar to itself. Nearly all were children, between two and ten years of age. All occurred between the last of May and the fifteenth of June. The longest duration of the disease proper was from five to six weeks, the shortest three or four days. In all the cases where I was able to get at an intelligent history, the disease commenced with a decided rigor, or chilliness, followed by great heat of the head, with severe pain, particularly in the back of the head, with at first full and hard pulse, sometimes irregular, hurried and noticeably panting respiration, pain and stiffness in the muscles of the back of the neck, with retraction of the head, in some cases almost to a right angle with the body, accompanied with extraordinary rigidity. Nearly all the cases had pains in the joints, either of the knees, elbows or ankles, usually of an intermittent character. Nearly all had distinct remissions or relapses. The temperature did not exceed 100° in the axilla." "Several of the children had been exposed bareheaded to the rays of the sun not long before the attack. Three had met with a fall within the preceding forty-eight hours. Two were taken down at school, where their brains had evidently been much exercised by study and religious catechizing,—as they were continu-

ally conning over their lessons in their delirium, and seemed terribly afraid the priest would punish them. Five cases occurred in the immediate neighborhood of a pool of standing water, the refuse of several blocks of houses crowded with Irish tenants." In conclusion, Dr. Abell records the following interesting fact: "During the past year, several cases of the head affection among small children, which occurs in connection with dentition usually, have proved fatal after a prolonged coma and, often, convulsions,—which a post-mortem examination showed to be pure cerebro-spinal meningitis,—i. e., the brain itself seemed normal, but the membranes were congested and more or less inflamed, and suppuration, to a greater or less extent, had taken place. These children died with symptoms often ascribed to hydrocephalus, but no serum was found."

Dedham.—Of three cases reported by Dr. Maynard, "No palpable cause. The locality was in all the cases good." Of four cases sent by other physicians of that town it is remarked: "All these cases seemed to arise from overheating, followed by exposure when the patients were fatigued to exhaustion."

Everett.—Dr. Wakefield says of the four cases he sends from this town: "My cases seemed to depend upon over mental and physical exertion, though in all these cases the land where the patient resided was low, marshy and damp."

Fall River.—Dr. Eddy, who reports six cases, says: "I have observed nothing worthy of special remark in regard to the home surroundings, drainage, water, etc., unless it be that their condition has been exceptionally good."

Fitchburg.—Dr. Hitchcock says: "My belief is, from professional observation and inquiry, that stiff neck, muscular lameness and soreness, headache and backache, were more frequent accompaniments or concomitants of both zymotic and climatic diseases in this city last winter and spring than usual."

Great Barrington.—Dr. Foster says, in connection with the single case which came under his care (a girl of fourteen years): "There was no cellar under that part of the house occupied by the patient; the house itself was damp; surroundings not good; privy too near; drinking-water obtained from a well near by. The patient had been closely confined to school."

Hadley.—Dr. Bigelow, referring to a case occurring in his practice, writes: "The home of this patient is on the bank of the Connecticut River, along the eastern side of which, in the town of Hadley, most diseases have, for several years, shown the influence of some epidemic depressing power. Soil, a sandy loam. Hygienic conditions good, except that the sink might possibly be considered in bad order for hot weather." Dr. Bonney writes, Dec. 8, as follows: "The disease has not presented itself to any extent in anything that could be called an epidemic form; indeed, there has been less of meningeal form of disease this year than usual. For the last ten or twelve years I have had to contend with secondary forms of the disease. If the system of the patient got lowered to any extent this condition has frequently been developed. This has been in past years so frequent, that one's anxieties were greatly increased respecting the termination of what might seem to be mild disease. The accession would be sudden, and either rapidly fatal or there would be a

lingering convalescence with great prostration. In 1863 diphtheria was very prevalent in this town, and its accession was very violent. It was attended with considerable fatality. Ever since that date there has been more of the meningeal difficulty. I cannot disabuse myself of the inference, that the proximity of diphtheria frequently is the indication of the origin of the brain disease,—*i. e.*, that the poison which produces the former may also allow of the development of the latter. I have also thought that typhoid fever stood sometimes in essentially the same relation."

Harerhill.—In six cases reported by Dr. Cheney, the locality is stated to be either "low or damp" or "low and damp" in all. In one case the patient was a shoe-fitter, and had worked in a damp shop, and his house was situated in a swampy locality, on new-made land, with damp cellar and poor drainage,—“all which circumstances combined promoted the disease.” Of another case he writes: “Patient’s house in a damp locality,—being a tenement over a shop where shoe-stock is prepared, from which a constant dampness rises and fills the rooms above; drainage imperfect; the air filled with impurity from surrounding buildings.” Of another (a child) he says: “She had been permitted to play outside the house in April, sitting on the ground; the soil wet; drainage poor; cellar damp.” Of the next he says: “Patient lives near the river, in the midst of a foreign population; cellar damp; drainage poor.” And of the remaining two cases: “They lived in a damp, undrained locality; no sewerage; cellar damp; air and water impure.” Dr. Fernald, in reporting a single case which came under his observation, says, “The locality is near a lake, where typhoid fever prevails when the pond is low. There are twelve or fifteen families in this locality, and two years ago there were measles and typhoid fever in every household.” Dr. Crowell reports three cases, in two of which “the soil was clayey, and the cellars damp; in one, high and sandy.”

Hingham.—In two cases reported the locality was “high, but near a sluggish tidal stream.”

Holyoke.—Of the five cases reported, Dr. Hummiston writes as follows: “The surroundings, in a majority of instances, were such as to invite typhoid fever. In fact, it had prevailed to a considerable extent in the same locality only a few weeks before; and while I was attending upon case 1, in this series, it was alleged a patient died of typhoid fever in the same square. No. 2 occurred in the same section of the city. But the characteristic marks were the same in all. What should cause them, however, is as much a puzzle to me as to any one else who has sought for the origin of this terrible disease.”

Lancaster.—Dr. Thompson writes: “Have seen no well-marked case of this disease in this vicinity, but still have observed a peculiar influence in other diseases,—more pain in back of head and upper spine than usual, not very marked or lasting, yet sufficiently prominent to be noted.”

Lawrence.—Dr. Chamberlain confirms the fact, so often stated, of the disposition on the part of physicians and others to exaggerate the extent of the disease by including in its category very mild cases resembling it in some of their features, but passing off spontaneously in a short time and without treatment,—showing, as we have stated elsewhere, the existence of an epidemic influence which gave a coloring, so to speak, of cerebro-spinal symptoms in divers insignificant ailments. “There have been many cases of pain,” he says, “often severe, in the head and neck, with little and, in some

instances, no constitutional derangement, which, I have no doubt, were the result of the specific influence which caused the cerebro-spinal disease."

"I am unable," he continues, "to say anything satisfactory in regard to origin or cause. It did not appear to depend, either for its remote or exciting causes, upon any influences arising from locality,—although a few cases were developed amidst surroundings which more than suggested that the vitiated air of ill-ventilated houses was instrumental in determining the disease."

Leverett.—Of a single case reported, Dr. Fish writes: "No appreciable cause; soil a gravelly loam; cellar dry and clean; sink and spring well cared for; drinking-water excellent."

Leominster.—A comparatively large number of cases have been reported from this town. Dr. Pierce, who gives the data of twenty cases, writes, in regard to the disease: "It seemed to be rather dependent upon epidemic influences than upon any local cause,—most of my patients having their houses on a light gravelly or sandy soil, with no fault of drainage, so far as I could ascertain. In some cases several members of the same household had the disease." He further says: "It seemed to select neighborhoods for its centres, thereby, indeed, indicating a local cause, yet what I could not satisfactorily ascertain. The patients were mostly healthy, robust, laboring people, in easy circumstances." Nearly all of these cases recovered; in regard to which, Dr. P. writes: "This unusual result is, I think, due more to the mildness of the attack than to the special mode of treatment." He further says: "A singular fact connected with these cases is this,—they were all Americans, with one exception, and that one was native-born, though we have a large percentage of foreign population." Dr. Field, who reports four cases, writes of one of these cases as follows: "The locality was low and damp. I consider the proximate cause to have been sleeping on the ground after a hard day's work; and among the remote causes may be named a life of hard work and gradually diminishing pecuniary means. Perhaps the water used by the family, taken from a neighboring pond, may have had something to do in causing the disease." He further reports, under date of Nov. 1, that, within a few weeks, he has seen and examined several supposed cases of the disease in patients who had the attack months ago and were not yet fully recovered. "We know," he adds, "that in all epidemics a good many forms of disease will, in a greater or less degree, simulate the epidemical affection and still not be genuine." And he presumes that some of the cases which came under his observation, in his own and others' practice, may have been of this character.

Lowell.—Under date of August 30, 1873, Dr. Nickerson writes as follows: "Nineteen out of thirty physicians consulted have had cases of the disease. Five others, not consulted, have recorded deaths." * * * "The epidemic has not been confined to any particular quarter of the city, but has been generally most severe in the more thickly settled parts of the town. The heights of the city, *e. g.*, Dracut Heights, Belvidere and the higher portion of Chapel Hill, have furnished but very few cases and only two deaths." * * * "The attack was almost always sudden, and, when sudden, began with headache and vomiting and prostration." Among the symptoms he enumerates headache as existing in every case, generally of a peculiarly intense character, delirium, tenderness over the spine, retraction of the head in a vast majority of cases, opisthotonos only occasionally, tonic and clonic convulsions of local

muscles not uncommonly, petechiæ in a few instances, hyperæsthesia of the skin in a goodly number of cases, a variable pulse, accelerated respiration, restlessness and jactitation. In regard to the severity of the present epidemic, he says: "On the whole, I should think that the epidemic had been a mild one." On the subject of causation he continues as follows: "After careful inquiry I get no light as to the cause of the disease. As in most of the epidemics in this country of which I have any knowledge, a majority of the cases occurred in the period between December and July; there were only a few scattering cases after that time. The only circumstance that has pointed to contagion was the occurrence of two fatal cases in one house, two sisters being attacked within two weeks of each other. While on the subject of causation it may be well to say that our system of sewerage is quite defective, and that the recent introduction of city water renders it relatively more so, though improvements are now in progress in this direction." "In comparing the rainfall and temperature of the epidemic season of this year with those of the same period in previous years I find nothing worthy of remark."

Under date of December 19, he writes: "Out of thirty-seven deaths from this disease, twenty-seven occurred between February and the last of July. Since August 1st, there has been a material decline in the number of cases." * * * "As to the matter of location: I thought of water-courses and damp soil in my earlier perambulations, but could not establish any law in this particular. Out of forty-eight cases which I have recently examined I find that only sixteen can be fairly placed in damp regions or in the line of water-courses."

Lynn.—Dr. Webster gives a detailed account of the character and habits of the epidemic as observed by him in Lynn, where the disease prevailed quite extensively. The attack, as a general rule, came on suddenly with severe headache, especially posteriorly, pain soon extending to the neck and back. Vomiting was oftentimes an early symptom. Retraction of the head was a common occurrence. All ages were attacked. Dr. W. likewise refers to the prevalence of spurious cases, so called, where the patients had the early symptoms of cerebro-spinal meningitis, but which, in three or four days, recovered or lapsed into some other and milder affection. The first death resulting from this disease which appeared upon the records at the city hall in Lynn dates back to March. Dr. W. thinks a few patients were attacked as early as February. He gives the record of four cases which occurred in his practice, in two of which the locality is stated to have been "dry" and in two "low and undrained." Both of the former were on the borders of a lake, where also several other cases occurred. In regard to the two last named of his cases the sanitary conditions are stated to have been exceedingly poor. Dr. Cahill says, of four cases reported by him, that the locality was "low or damp" in three and "fair" in one. Dr. Galloupe says, of nine cases which he reports: "I have been unable to find any cause, proximate or remote. The disease has appeared under every variety of condition, among old and young, rich and poor." Three out of five cases reported by Dr. Drew are supposed to have had for their proximate cause "over-exertion." Dr. Goodell says, of three out of seven cases reported by him, that the locality was near a pond. In one other, the sanitary conditions were "very poor," in the rest, "fair." Dr. Newhall, who reports six cases, writes: "In no instance could I discover any cause, either in the locality or condition of the patient, which could in any manner predispose

to the disease." Out of four cases reported by Dr. Kilham, the locality in three was "low and damp."

Manchester.—Dr. Priest reports no cases, but says that he has had several which seemed to simulate the disease, with pain on the back of the head and neck and muscular contractions.

Marblehead.—Dr. Eveleth reports four cases, and refers to "an impure atmosphere, especially in a damp district," as, in his opinion, a cause of the disease. Dr. Neilson, who gives four cases, reports the locality to have been "low and dry" in two, "low and damp" in one, and in one, "high and dry."

Methuen.—Dr. Chamberlain reports a single case, of which he says: "The patient lived in a tenement boarding-house, on a dry soil, but close upon a bank bordering a sluggish stream. The house was crowded and the air impure."

Millbury.—Dr. Lincoln gives the details of five cases, of which he says: "I know of no cause other than epidemic influence. In 1872, there were some fifteen or twenty cases of the disease in this town, and then a much larger per cent. were fatal."

Milford.—Dr. Barns gives the details of nine cases which came under his care. In regard to them he says: "Nearly all the cases which have come under my care the present year, and in previous ones, have been those whose physical and mental powers had been more or less overtaxed or whose general health had been somewhat impaired by some previous disease. This being the fact the question with me is, Is this one of the causes of the disease, and is the tendency to it transmissible?"

New Bedford.—Dr. Prescott sends the details of a single case, in regard to which he says: "The house was situated on low made land. Walls of bedroom constantly moist; no cellar; privy in rear, and drainage flowing from the house."

North Bridgewater.—Dr. Borden gives the details of four cases which occurred in his practice. He can find no special cause for the disease. The locality was damp in one, low and damp in one, and good in two cases.

Northampton.—Dr. Fiske reports that eight cases had "come under his observation at some stage of their progress. Of these, six were American, two were of Irish parentage; three were adults, five were children; seven were of the female, one of the male sex. Six recovered and two died."

North Adams.—Dr. Babbitt, in a recent communication, writes as follows: "In the spring of 1871, cases of cerebral meningitis were by no means infrequent in this locality. They were of a marked character and plainly diagnosed,—continuing with decreasing severity till autumn." * * * "What I would especially remark is, that since that period we have had no distinct typhoid fever. I have been in this locality more than twenty-five years, and have never passed an autumn without cases of typhoid fever till the seasons of 1872 and 1873; since which I have had no well-marked case of that disease."

"Pharyngitis, pneumonia and other febrile diseases have, in almost every instance, taken on cerebro-spinal symptoms; and it is common for the patient to say, if his head is raised for any purpose,—'you hurt my neck!'—so that it is difficult to tell which is the disease,—the pneumonia, etc., or the cerebro-spinal meningitis. This general observation has struck me forcibly in connection with disease in this locality."

Palmer.—Dr. Holbrook had a single case about which he says, "Water and drainage good; no traceable cause of the disease."

Peabody.—Three cases are reported. In one—"the location is a level area of ground, nearly circular and surrounded by hills and farms,—a sort of amphitheatre, as it were, perhaps three-fourths of a mile in diameter: the soil, dry. Not far from the house a field is used for the purpose of drying glue-stock, and from this the smell is sometimes very offensive. The drains of the house were in a slovenly condition, discharging within fifteen feet of the well." In the second, the house stands "on low made land; a tannery on one side and a morocco manufactory on the other. The smell is offensive, and the air must be very impure." The third was in a healthy locality. The patient (a young woman) "had been at work at Lynn for some time, at a shoe establishment, using a sewing-machine and confining herself very closely, working, at times, sixteen hours a day; she had been for years subject to bilious attacks."

Quincy Point.—A single case. The house of the patient "stands on a low, porous soil, and within an eighth of a mile of tide-water. His sleeping-room is large and well ventilated; cellar, dry; sink empties into the privy, which is about a foot from the house. Half a dozen other persons live there, and are all in good health."

Roxbury Highlands.—Dr. Flint gives a report of two cases, of which he says: "I cannot think either case referable to bad drainage or impure water. The first was in St. James Street; drainage, good; water, Cochituate. The second was at the Simmons estate, Highland Street, with which locality Dr. Derby is probably familiar. The water, I presume, is well-water. I made no inquiries in regard to drainage." Dr. Streeter also reports two cases which he could not trace to any special cause. He had also "seen many cases accompanied with cephalalgia and rachialgia, requiring a few days' release from business; no special treatment; others did not give up business or occupation. Evidently a strong epidemic influence prevailed throughout the winter and spring."

Salem.—Dr. Johnson writes: "We have not seen much of cerebro-spinal meningitis in Salem. There have come under my own observation several cases of intense and uncontrollable headache, affecting chiefly the back of the head, with muscular pains and slight stiffness of the neck, suggesting for several days the commencement of an attack of cerebro-spinal meningitis. But, without further development of symptoms, the pains would slowly decline and cease. These cases seemed to me peculiar, and in conversation with Dr. Kemble, I found he had met with several cases in which there seemed to be but little lacking to constitute the initial symptoms of the disease. The quiet departure of the symptoms suggested to me an abortive cerebro-spinal meningitis; yet, the cases were too ill-defined to be satisfactorily classified. Of the few genuine cases which have occurred, the locali-

ties have not been peculiarly damp, some of these cases occurring in the drier portions of our city."

In a letter of later date, Dr. J. gives an account of a large number of typhoid fever cases, which occurred during the summer and autumn, and sketches the localities in which this disease especially prevailed. Bad air and water, insufficient drainage and unsanitary surroundings made up, as usual, the prevailing elements attendant upon the advent of the fever. But cerebro-spinal meningitis did not, as we have seen, particularly flourish in these localities, although the predisposing cause was imminent during the earlier part of the year.

Sandwich.—One case reported: "Can give no cause; the locality is at least thirty feet in altitude above sea-level; plenty of air and light; no miasm."

Somerville.—Of six cases reported, the locality in five was found to be "low and damp." Dr. Knight gave the details of two cases only, though he "had seen many more." "Locality," he says, "seems to have had no marked influence. In none of my cases can I refer to any origin or cause."

Springfield.—Twelve cases are reported. The locality was "low," or "low and damp," in nine cases, "damp" in one, "high" in two.

Stoughton.—Dr. Tucker reports seven cases, and says, "I could not discover that locality, whether high or low, damp or dry, had any influence."

Swampscott.—Dr. Chase says of a case reported by him: "He was as healthy a young man as we have in town, of good habits, etc. I know of no cause why he was attacked with this disease."

Tyngsborough.—Dr. Dutton had two cases, "five miles apart." Of one of them he says, "Her earliest symptoms date sharply from exposure in a damp night, with wet feet."

Ware.—Dr. Miner says: "I have neither seen nor heard of any cases of cerebro-spinal meningitis in this region. We have had a few cases in which there were complaints of pain in the neck and back, but not sufficiently severe for treatment, or to warrant us in calling it the genuine disease, though there was evidently a tendency that way."

Watertown.—Dr. Hosmer relates the following somewhat curious circumstance in regard to three cases of the disease which came under his observation, the patients being two brothers and a sister: "Their home was in the village of Watertown, in the second story of a house with fair surroundings. The eldest (a boy), fifteen years of age, was living on a farm two miles away, visiting his family every Sunday. He was seized with the disease, while away from home, at the same time that his brother and sister were ill with it at his father's house."

Webster.—Dr. Brown gives five cases. He says: "I am unable to state any specific cause for the occurrence of the cases aside from the supposed epidemic influences, as the circumstances of these patients, with the exception of two which occurred in same family, were very unlike in almost every particular; and I saw no especial reason for the attack."

West Roxbury.—In three cases reported by Dr. Maynard, he finds “no apparent cause.”

Weymouth.—Dr. Forsaith reports a single case, which, he says, occurred in the vicinity of other families and among a healthy population.

Williamstown.—Dr. Smith writes, in regard to his experience in this disease, as follows: “I have not been able to discover the cause; I once attributed it to the water; and my conviction now is, that to that source, combined with local causes, as previously set forth, is to be ascribed the disease.”

Winchendon.—Dr. Ira Russell states that six cases of cerebro-spinal meningitis had come under his observation and treatment during the past summer. He also states that he had been familiar with the disease in the winter of 1863-64, during his army life. He says the disease was “almost invariably ushered in by a chill, great prostration, nausea, vomiting, severe pain in the head, neck and back, delirium, sometimes wild, but more commonly moderate, the patient being easily roused to answer questions, but immediately relapsing into his former condition, with contraction of the muscles of the neck and back, rigidity of the extremities and great restlessness. Deglutition was commonly difficult, often impossible. The patient would commonly remain in this condition from twelve to thirty-six hours, when re-action would come on, followed by fever, usually of a typhoid type, lasting from one to six weeks, sometimes ending in recovery, oftener in death.” In regard to causation, he believes the disease to be undoubtedly due to an epidemic influence, “an influence more nearly allied to that which produces influenza, peritonitis and pneumonia rather than to the idiopathic fevers, like typhus and typhoid.”

Winchester.—Dr. Winsor could find “no assignable cause” for the few cases which came under his observation.

Woburn.—Dr. Cutter reports four cases. In two the locality was “unfavorable”; in two it was “fair.” Dr. C. says: “It is my opinion that cases of cerebro-spinal meningitis occur in Massachusetts, which, from their mildness, are sometimes overlooked and mistaken. There is a mild form of the disease which may be thought rheumatic.”

Worcester.—Twelve cases are reported. Of these Dr. Clark reports seven, and says that three cases occurred in one family and two in another. Of the former group he says: “The house is in a generally healthy location; it stands, however, upon a bank, sloping towards the street, so that the land in the rear is considerably higher than the front. Two families occupy the house. The sink-drains open at the side of the L part, and the drainage flows in a superficial gutter, by its side, to the front, and from thence, under the sidewalk, into the street sewer. The well is outside and a little below where the sink-spout debouches.” Of the latter group he remarks: “The location of the street is high, upon a hill sloping to the north; soil wet, with hard-pan beneath; hygienic surroundings very unfavorable.” Dr. Clark states that there were fifteen cases in that city, and one in Millbury, in the seven months from December, 1871, to July, 1872, inclusive.”

Having thus quoted largely from the correspondence of medical gentlemen, in various parts of the State, as to the locality and other circumstances connected with the origin of

the disease, I will add the results of my own personal investigation in several towns and cities where the epidemic has more extensively prevailed.

Charlestown.—In company with Dr. Forster, I personally inspected the following localities :—

Case I. *A child, 24 Henley Place.*—One in a row of tenement-houses, each floor of which is usually occupied by two families. The living-rooms were, in this case, on the second story, back, and consisted of a kitchen and sleeping-room, the latter about 7×10 feet in dimensions, opening out from the kitchen, and having one small window looking into the back yard. These houses were on made land. Cellar in fair condition.

Case II. *Adult male, 108 Water St.*—Old house, near the navy-yard gate. Kitchen opens out upon the back yard. Sleeping-room of the patient 12×14 feet, without windows. Back yard filthy; privy-vault full and overflowing. Tide-water flows at times into cellar. No drainage.

Case III. *A child, 12 Thorndike St.*—A few rods from mill-pond,—the receptacle of Miller's River; land low; no drainage; privy in back yard. Water flows into the cellar. Contents of two sinks empty upon the ground cellar-floor. Family recently from Devonshire, England, and much disgusted with their present home. Much complaint of the bad air coming up the stairway from cellar.

Case IV. *Adult female, 41 Chestnut Street.*—A cheerful and pleasant street; high and dry; sanitary conditions apparently all right; cellar said to be dry and drainage good. I learned that this patient, the day before her attack, attended a funeral, went down into the vault, where she remained some minutes,—that the tomb was cold and damp, and she felt chilly while there.

Case V. *A child, 39 Henley Street.*—On low ground; floor of cellar covered with boards, partially decayed; house drain said to be connected with the street sewer.

Case VI. *Adult female, 44 Henley Street.*—Tenement-house; surroundings poor, but not of the worst; living-rooms a kitchen and bedroom adjoining, on ground floor, back; bedroom small, immediately over cellar, which is not wet, but in a slipshod state generally; bad smells complained of.

Case VII. *Adult male, Allston Street.*—A pleasant, cheerful-looking street; locality high and dry. This man worked in a furniture factory on "the point," so called, close to the water.

Case VIII. *Adult male, Mount Vernon Street.*—Locality apparently dry and pleasant. This man was a rigger, and employed much about ships and docks.

In addition to the above localities, which were personally visited, the exact position of a great many other cases which occurred in this city was obtained by our medical correspondent and marked down upon a map. They were in the main low and damp, were mostly upon made land and near the water, with marked exceptions, however, as in the list above given. On consulting this map, I find the locality of 49 cases thus designated.

Chelsea.—The following places in which the disease had occurred were visited in company with Dr. Wheeler:—

Case I. *A child, Williams Street.*—A double house. The locality of the street itself is good. The foundation of the house, however, is four feet below the level of the street, with kitchen and cellar on the same level, *i. e.*, a basement kitchen, where the family principally live. Drains connected with the main sewer, but were without traps. This house has been complained of to the authorities for its unsanitary condition. Dr. W. says he never knew a family to live there six months without cases of illness or death. Since the occurrence of the present disease the drains have been repaired and a trap affixed.

Cases II and III. *Marginal Street*.—Two cases occurred here,—one a child, the other an adult male. The house backs immediately upon the water, and is too low to allow of drainage. The living-rooms are on the ground floor, and consist of a kitchen and sleeping-room.

Case IV. *A child, Middlesex Street, lower end*.—Living-rooms on a level with street; basement or cellar falls off in rear, which is used as a cow-yard, and is foul and filthy; surroundings also bad. A pool of stagnant water stands within two or three rods of the house.

Case V. *A child, Maverick Street*.—Living-room on first floor, level with the street, with basement or cellar falling off in rear. In this basement was a bar-room where liquors were sold. A foul smell noticeable; land low, about one hundred yards from the water; drain said to enter the street sewer.

Case VI. *A child, Maverick Street*.—House small; situation low; surroundings bad; cow-yard twelve or fourteen feet from the house, foul and in bad condition; no cellar; no drainage possible.

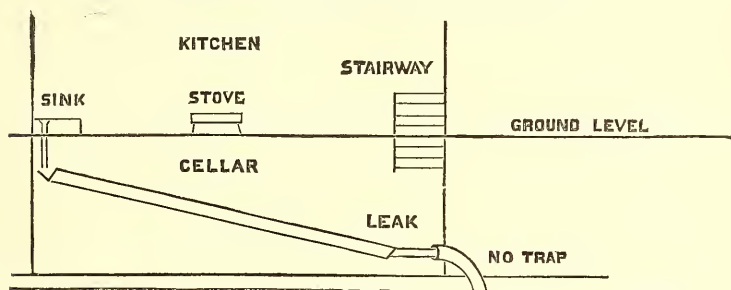
Case VII. *A child, Central Avenue*.—The house was shut and the family absent. Surroundings apparently good. Could learn nothing definite about the drainage.

Case VIII. *Adult male, corner of Central Avenue and Lynn Street*.—Locality good; ground rather high; house new; surroundings apparently good. Did not enter and inspect the premises for domestic reasons.

Case IX. *Adult male, Middlesex Street*.—To a casual observer this house would seem to be well situated, with fair surroundings; but on examining the premises it appeared there was a cellar, perhaps twelve or fourteen feet square, under the rear of the house, directly beneath the kitchen. The drainage from the sink of said kitchen passed into an open, V-shaped wooden trough, and was thence conveyed across

the cellar to the opening of a pipe three or four inches in diameter, not trapped, which conducts presumably to the street sewer. At the junction of the trough with this pipe the connection was so loose that the greater portion of the slops emptied directly upon the cellar floor, which was of boards laid upon the ground. A foul, strong and constant stench pervaded the cellar, which had no connection with the outer world other than by means of the stairway and door through the kitchen. It was stated that this patient was in the habit of rising early (4 to 5 A. M.), making a rousing fire in the kitchen, and there reading his paper, etc., till he went to his work. To make clear the description above given, a diagram of these premises is subjoined.

SECTION OF KITCHEN AND CELLAR CASE IX



Case X. *A child, Pratt's Block, off Second Street.*—This is in a row of wooden houses, of a mean class, in dilapidated condition, without cellars, and having their ground floor four feet below the level of the street; living-rooms on ground floor, comprising kitchen and sleeping-room, of eight-foot stud, dark and ill-ventilated; sink foul, its contents emptying directly upon the ground. A marsh comes up to within a few rods of the house. Yard uncleanly; the whole place redolent of bad smells.

Case XI. *A child, Auburn Street.*—House old, dilapidated; basement-cellar flooded at times, and always foul and damp; no drainage. Twenty feet from house is a large pond of greenish water, into which flows the refuse from the Chelsea Laundry. A great mortality of children from cholera-infan-

tum and like diseases is reported in this locality in the hot months.

I have given on a previous page the report of Dr. Wheeler, in which he states that all, or nearly all, the cases which have come to his knowledge, have occurred on the low, marginal lands, where the soil is to a greater or less extent saturated with moisture. "The same localities," he says, "where they usually expect to find the majority of their cases in epidemics of typhoid, diarrhœa, etc."

Cambridge.—Accompanied by Dr. Wellington, I inspected the locality of such cases as he had been cognizant of in that city.

Case I. *A child, Somerset Street.*—Surroundings bad; land low and marshy; water at high tide comes up very near the house; no cellar; no drainage.

Case II. *Adult male, Webster Street.*—House on a dry and sandy soil; surroundings fair; in the yard is a cesspool not connected with the street sewer. This patient was employed in a druggist's store, under the Revere House, in Boston, and was seized suddenly while about his work and taken home for treatment.

Case III. *Adult male.*—House in near vicinity of the marsh; living-rooms on the ground floor; kitchen immediately over a cellar which is very damp and foul. The patient was an old man, and spent much of his time in this kitchen. The house had been much complained of for its bad smells. Quite recently the house drain had been connected with the street sewer.

Case IV. *River Street.*—Locality apparently all right. Premises not entered, but Dr. Wellington reports that to his knowledge no sanitary defects exist.

Case V. *A child.*—Locality, an Irish settlement on low land; a sort of hollow in which water collects after rain; no cellar; surroundings poor.

Case VI. *Adult, Bigelow Street.*—High and dry ; drainage good ; to outside appearances everything all right ; premises not entered.

Case VII. *A child, Austin Street.*—Soil dry ; drainage good ; at very high tides water backs up and enters the cellar ; this has not happened the last year.

Case VIII. *A child, ——— Street.*—Situation of house low ; water comes into the cellar in winter and spring after rains and thaws ; the occupants think it was more than usually wet last season ; cellar floor covered with boards partly decayed.

Case IX. *A child, Tremont Street.*—House one story ; surroundings bad ; no drainage ; large pool of stagnant water about two rods distant.

Case X. *A child, Cambridge Street.*—Land is low in rear ; water from the sink empties into back yard direct ; no drainage ; cellar said to be dry.

Case XI. *A child, Rideout Street.*—An Irish settlement ; land low ; soil heavy ; stagnant water in immediate vicinity ; no cellar ; no drainage.

Case XII. *A child, Cambridge Street.*—Surroundings poor ; tide-water comes into the cellar at times.

Case XIII. *A child, Cambridge Street.*—Locality somewhat low ; living-rooms on second floor ; surroundings fair.

Haverhill.—Dr. Crowell made with me a tour of inspection covering the undoubted cases which had come within his knowledge.

Case I. *Young man, Spring Court.*—This case occurred in a row of tenement-houses of a good class, newly built, standing on rising ground, with good chance for drainage. Soil heavy ; cellar damp, the water percolating through the walls

from the higher grounds beyond, and at times standing upon the floor of the cellar. At the time of our visit the moisture had been absorbed by a layer of gravel put upon the floor for this purpose ; general aspect of the house cheerful and pleasant.

Case II. *Adult male, Spring Place.*—Kitchen and cellar in basement, the floor of which is a little below the general surface. An exceedingly offensive odor exhales from the sink-opening, filling the kitchen with a sickening stench. This kitchen connects by a stairway with the sitting-room where the patient had been accustomed to pass his evenings. Adjoining privies and sink-drains likewise in bad condition.

Case III. *Adult male.*—House of average quality, with cellar-kitchen ; no noticeable odor about the house itself ; cellar close and ill-ventilated ; apparently not damp. A stable adjoins the house in rear, on land a little higher, the drainage from which must by gravity tend towards, if not enter, the cellar ; privy of an adjoining house overflowing and producing an offensive odor.

Case IV. *A child, Mount Washington.*—House about one hundred and fifty feet above the river, and some fifty rods distant ; apparently dry and sandy surface ; family lived in second story ; there was a cistern in the cellar ; the cellar itself in fair condition.

Case V. *A child.*—Locality about a mile from the town, elevated two hundred and fifty feet above the river ; soil rich and loamy, with clayey substratum ; cellar very damp a great part of the time, water standing there sometimes to the depth of two inches or more. The family have sometimes fancied they perceived a foul odor and damp air coming up from the cellar, through the register-openings, into their sleeping-rooms ; a bad smell from the privy, in close vicinity to the kitchen complained of.

Case VI. *A child, rear of Primrose Street.*—A crowded colony, of French mostly ; surroundings bad ; soil clayey ; water stands after a rain ; no drainage.

Case VII. *Chestnut Street, off Water Street.*—House on a declivity, perhaps forty feet above the river, and twenty rods from its northern bank; surroundings good; the water, however, from the higher ground flows into the cellar, making it wet and foul, and often necessary to "put down boards"; had been very wet and damp just before patient was attacked; there was a disused well in the cellar, and an offensive odor in the sitting-room immediately over it; the drainage from the sink is carried into the garden a few feet from the house.

Case VIII. *Adult female, Green Street.*—House appeared all right; cellar a trifle damp, but not wet; the flowage from the sink of the next house above is seen upon the surface about ten or twelve feet distant, and has been "complained of."

Case IX. *Adult female, Auburn Street.*—House small; soil clayey and damp; no drainage; cellar very damp; two or three inches of water stands there, the exit of which has become stopped up; an offensive smell comes up the cellar stairway into the sitting-room immediately above; sink empties into a hogshead set in the ground.

Case X. *A child, in "Portland Extension."*—House stands high; cellar in fair condition; the locality of this house is good; the sink-drainage stands where it is poured out, quite near the house; but on the whole the hygienic conditions are favorable.

Lynn.—In company with Dr. Webster, I visited and examined the localities and habitations where a majority of the well-authenticated cases of the disease had occurred.

Case I. *Oxford Street, between Willow and Almont, right side.*—Land low; surroundings poor.

Case II, *A child, Willow Street, between Oxford and Liberty, left side.*—The family occupied the upper story of an old house; shop underneath; land low; surroundings bad; the surface bestrewed with manure and garbage; a pool of stagnant water near.

Case III. *Central Street, north side, near City Hall.*—House surroundings fair.

Case IV. *A child, C Street, water side, in near vicinity of lumber yards*—This street skirts the harbor, is muddy, almost impassable in spring; soil saturated with moisture.

Case V. *Adult male, Pleasant Street, foot of Harbor Street.*—Soil low and damp; surroundings bad; cellar always wet. The tide-water backs up through the drain, standing sometimes a foot or more in depth; sink empties into back yard direct; a pool of stagnant water near. There has been much sickness in this house during the past year, typhoid fever or rheumatism being almost constantly present.

Case VI. *A child, on the same street, and near the above.*—House similarly situated; cellar damp and uncleanly; apparently no drainage; bad smells.

Case VII. *A child, Tyrrell's Block, on Pleasant Street.*—This block consists of several rows of wooden houses, all of the same build. The street, in this part, is "very muddy, and difficult to drive through in spring." Land low; surface-water runs readily into the cellar. It has water supplied from the water-works, and each tenement is furnished with a water-closet in the cellar. I learn that a fatal case of the disease occurred in this block six months previously.

Case VIII. *A child, Bond Street, west side.*—General situation and construction of tenement similar to that in preceding case. Land low, but the soil drier; cellar damp; surface-water sometimes flows into it.

Case IX. *A child, Church Street, south side, quite near Lynn common.*—Land somewhat low, but not damp; surroundings good; aspect of house and street cheerful and pleasant; no sanitary defects.

Case X. *A child, Emerson Street, west side.*—Land low and flat; it is, however, dry and pleasant. Sanitary surroundings good; cellar in fair condition.

Case XI. *North Common Street, north side.*—Surroundings good ; premises not examined.

Case XII. *A child, Water-Hill Street.*—Irish settlement ; poor class of dwellings ; very near the mill-pond, formed by a sluggish stream which connects Flax Pond, or Wyoma Lake, with Saugus River.

Case XIII. *A child, Boston Street, north side, near Raddin Court and near the Saugus River.*—Ground marshy in near vicinity ; surroundings generally poor.

Case XIV. *Raddin Court, north side, near the last case.*—Position higher ; soil apparently dry.

Case XV. *Winter Street, south side, midway between Stony and Strawberry Brooks.*—House small and poor ; land wet ; drainage bad.

Case XVI. *Washington Street, near Main, north side.*—Land low ; house better than ordinary ; apparently no drainage.

Case XVII. *A child, Loughton Street, south side.*—House of one story, with cellar and attic ; stands comparatively high ; cellar damp, and water backs in from drain.

Case XVIII. *Off Jenness Street.*—North side of Wyoma Lake, and within three or four rods of its margin ; behind is a rocky and fairly wooded hill ; surroundings apparently good.

Case XIX. On the same side of the pond and just upon its border ; surroundings good.

Case XX. *Near Browne's Pond, east side.*—Surroundings good.

Case XXI. *A child, Browne's Block (Wyoma).*—East side of Main Street and close to the westerly point of Flax Pond.

Locality bad; marshy grounds, saturated with stagnant water, in rear; close by is a water-course connecting Wyoma and Wenuchus lakes.

Case XXII. *Boston Street, east side, near the lakes.*—House small, of two stories; in the lower is a barber's shop; ground in rear of house marshy and low. Two cases occurred in this house.

Case XXIII. *Adult male, Lake Street (Glenmere).*—This was an old man who lived alone in a small tenement, with a wood-house or lumber-room beneath, twenty rods or so from Flax Pond; surroundings poor; no drainage.

Case XXIV. *Adult female, Lake Street, east side.*—About the same distance from Flax Pond as the preceding case. Sanitary surroundings good; cellar in fair condition; drinking-water obtained from a pump near by; drains apparently all right; vegetables stored in the cellar.

Case XXV. *A child, Maple Street, east side.*—Distant one or two rods from Flax Pond. Premises not examined.

Case XXVI. *A child, Fayette Place, north side.*—Small tenement; no drainage; stagnant water after a rain. A few rods north of this house is a small pond.

Case XXVII. *A child, Essex Street.*—House has two stories and an attic; in fair sanitary locality, airy and pleasant; but there is a hollow in the near vicinity, on the west side and across the road, where the soil is wet and heavy and water stands after a rain. In other respects, surroundings good.

Case XXVIII. *Amity Street, lower part.*—The locality is low, near the margin of salt water, with marshy grounds around.

Four other localities were visited, but the premises were not examined. They all had apparently good hygienic surroundings.

Salem.—But comparatively few cases have occurred in this city. Early in the season, I examined, with Dr. Johnson, the following localities, where he had heard of the existence of the disease :—

Case I. *Daniels Street, off Derby Street.*—Now a dilapidated portion of the town; near the harbor; sanitary surroundings fair.

Case II. *A child, Pratt Street, off High Street.*—Surroundings generally poor. This is a sort of court, near the mill-pond.

Case III. *A child, Webb Street.*—This street skirts Collins Cove; land is low; hygienic conditions poor.

Case IV. *Adult female, South Prospect Street.*—This locality is almost on a point of land, having water on three sides. Sanitary surroundings fair.

We now present, in briefest form, an analysis or *résumé* of the principal facts and circumstances received in answer to the series of questions before stated.

The details, more or less complete, of *five hundred and seventeen cases*, are given. All ages, occupations and nationalities were alike amenable to the disease. The age of the youngest patient on the record is five weeks, that of the oldest seventy years. Two hundred and thirty-one were males, and two hundred and eight were females; in seventy-eight the sex was not stated. The character of the attack in the large majority of instances was sudden, without premonition or previous noticeable illness.

The earlier and later symptoms correspond very nearly with those I have named as belonging to the disease in a former part of this paper,—violent, often excruciating, pain, referred to the back part of the head and neck, with muscular stiffness and a tendency to retraction of the head, great sensitiveness of the surface, restlessness and jactitation, with irregular panting respiration and delirium, mostly of a superficial character, were the prominent symptoms.

The condition or circumstances of the patients, whether easy or otherwise, were pretty evenly balanced.

The disease prevailed most extensively during the spring months. Of three hundred and ninety-four cases in which the date of the attack is definitely stated, ten began in January, twenty-five in February, eighty-four in March, one hundred and sixteen in April, ninety in May, thirty-seven in June, ten in July, eight in August, five in September, seven in October, one in November, and two in December. The first recorded case bears date January 6th. Relapses or decided remissions are referred to only in a minority of instances. The shortest recorded duration of the disease is two hours, the longest six months.*

It would be out of place here to enter upon the question of treatment. From the evidence in hand, we feel bound to say that no line of therapeutical management can absolutely control or cut short the disease, though much can be done to comfort and relieve the patient. The mortality in the five hundred and seventeen cases adduced was a little less than forty-four per cent. This goes to confirm the opinion expressed by many of our correspondents, that, compared with former epidemics of which we have record, the present visitation must be considered a mild one. The post-mortem records of the epidemic are few and meagre; but the developments, so far as observed, tally with the already chronicled facts in the pathological history of the disease.

The locality is stated in four hundred and forty-six cases. It is said to have been "low and damp" in one hundred and thirty cases, "low and dry" in thirty-seven cases, "low" in eighteen cases, "damp" in twenty-one cases. It was "high and dry" in eighty-nine cases, "high and damp" in seven cases, "high" in twenty-two cases, "dry" in sixty-one cases. It was said to be "medium" in sixty-two cases, and in seventy-one cases the nature of the locality is not stated. By this it will be seen that the low or damp element is somewhat in the ascendant.

* As a complication, or sequel, of this disease, ophthalmic affections are not unfrequently observed. So also affections of the ear, resulting in deafness, are not uncommon. We are permitted by Dr. Clarence J. Blake to refer to his private notebook for the year ending Oct. 1, 1873, from which we derive the following facts.

Has the disease prevailed among animals? Returns from Boston, Brighton, Charlestown, Fall River, Lynn, Newton, Stockbridge, Wakefield and Worcester, all speak of the existence of the disease, to a greater or less extent, among animals. Horses and cows appear to have been most often affected; after that hens and chickens, and in some instances dogs and cats; so that the cognomen, "pandemic," as applied to this disease by a recent medical writer, is not wholly inapt, though of somewhat questionable etymology. The following account of the disease, as it appeared to a considerable extent among horses in New Bedford, has been furnished by Dr. O. H. Flagg, a well-informed and reliable veterinary surgeon of that city. Under date of July 9th, 1873, Dr. F. writes as follows:—"Since the first of January, sixteen cases of the so-called cerebro-spinal meningitis have come under my observation and treatment. Of these, fifteen were horses and one a calf four months old. The ages of the horses varied from five to sixteen years; two only were over twelve years old; nine were males, six were females. Their symptoms were as follows:—They were attacked with violent pain, followed, in most of the cases, with a rapid swelling of the lumbar and sacral muscles, which became as rigid and hard as iron. After the subsidence of this condition the muscles became exceedingly lax and flaccid, with more or less impaired contractile power, but without entire paralysis. In one case the muscles of only one side were affected; in others this affection showed itself more severely on one side than the other. The sensation continued intact. There was, in many cases, a

Twenty-seven cases of deaf-mutism came under his observation in the time named, the origin of which he clearly refers to cerebro-spinal meningitis. Commenting upon these cases, he writes as follows:—"The majority of the cases of deaf-mutism resulting from cerebro-spinal meningitis, were presented for examination within four weeks from the time of the attack. In most of them the history was the same,—the child having heard well before the illness, and the deafness being first noticed when convalescence began. In a few cases the deafness was noticed early in the disease. In the majority of cases, moreover, the external and middle ears were in a comparatively healthy condition, the exceptions being traces of slight catarrhal inflammation of the middle ear, not sufficient to account in any degree for the deafness, which was in all but two of the cases, so far as could be ascertained, total. In these two cases there was hearing for loud noises. It is probable that the sound of their own voices in speaking was heard by some of the remaining patients, but their age rendered it difficult to determine this point." All the cases above referred to were children, the youngest being two and the oldest twelve years of age.

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Cerebro-Spinal Meningitis in Massachusetts.

scanty secretion or complete suppression of urine; in others very high-colored urine, and great difficulty in evacuating the bladder. In eight of these cases opisthotonos was well marked; in three the muscles of the neck and fore extremities became swollen like those of the lumbar region before described. There was partial coma in two cases, *i. e.*, the calf and one horse. They could, however, be easily roused at any time. I saw no evidence of active delirium. In one case there was paralysis of the optic nerve of the left eye, commencing two days before death. My treatment consisted of fomentation of the affected parts with blankets dipped in hot water, which were covered with dry cloths to prevent evaporation; alternating with this the parts were bathed freely with ammonia and camphor-lotion, repeating the process until the pain subsided. Internally cathartics and diuretics were administered, followed, as improvement advanced, by nervous stimulants and tonics, along with good diet. Three of these animals died, and one other will probably succumb to the disease; the other twelve are convalescent. The duration of the disease was from five to fifteen days. The condition and situation of these animals, as to place of abode, general care, usage, etc., were decidedly varied. The post-mortem appearances were a general congestion of the psoas and iliac muscles, and also of the external lumbar and sacral muscles. The meninges of the posterior part of the spinal cord were inflamed, with a quantity of colored fluid in the canal, the amount of which I was unable to measure. The vessels of the arachnoid were full to distention, and, in spots, this condition seemed to dip down into the cord itself. There were petechial spots extending over the dorsal portion of the cord. The kidneys were inflamed (or, perhaps more properly, congested) and enlarged."

It remains to see if, from all the evidence we have adduced, any reasonable deductions can be drawn which shall throw some light upon the vexed question of the etiology or cause of this affection. It is well known that during the autumn months of the preceding year a remarkable and wide-spread disease, of the influenza type, prevailed among horses. This State suffered among others, though not, as I am aware, with exceptional severity. It was a common prediction with some

of our most intelligent medical observers that an epidemic among human kind would probably follow. In this State such prediction was certainly verified. With the advent of cold weather came an unparalleled visitation of small-pox, the like of which, for its wide extent,—for virulence and fatality,—had not been known since the times of Jenner. This epidemic ran its course, and subsided with the disappearance of the extreme cold weather of midwinter. Co-incident with this subsidence arose the epidemic with which we have now to deal, and which has prevailed, as we have seen, to a greater extent than ever before in this State. These are curious facts,—perhaps nothing more.

We have long been familiar with what is called, for want of more definite knowledge, a prevailing epidemic influence,—a certain something which pervades the air, and rests like a baleful shadow on the land. Its very mystery adds to its force, and tends to excite terror and dread among the people. This, in medical parlance, is called a remote or general cause of disease. It prevails in certain years, or at certain seasons of the year, and threatens all alike. But there are immediate or exciting causes which, at such times, determine the individual attacks. In some diseases these proximate causes are well known—*e. g.*, in small-pox it is direct contagion; in typhoid fever it is bad drainage or impurity of the air, or water, or food, or all together; in typhus, it is contagion and insanitary influences combined.

But in the affection under consideration its origin or immediate cause is not so clear. We have seen that the condition in life and the nature of the locality do not seem to have exerted any positive controlling influence in the production of the disease; neither extreme cold nor heat seems especially to favor its propagation; nor do we find any just grounds for relief in contagion as a specific cause.

The relation of insanitary conditions in and around the abode of the patient to its origin or supposed cause, demands the most careful consideration. In weighing the evidence contained in the returns, I find the scale to be pretty evenly balanced in this particular. The cases are distributed among all classes and grades of society,—the high and the low, the rich and the poor, locations unexceptionable for situation,

open to abundant light and air, and the pent-up hovels of the lowly and wretched, have all contributed to the material of the epidemic. We believe, therefore, that the *primal* origin of the disease is atmospheric, and, for the present, beyond our ken.

It would seem, however, from the multitude of facts that have hitherto been collected, that, in times of epidemic influence, in this as in other diseases of a kindred nature, any defect of known hygienic and sanitary conditions in and about the patients' residence may, if his system be otherwise made ready or predisposed, through want, deprivation, mental or physical exhaustion, anxiety, or other depressing cause, tend to precipitate an attack, while under other circumstances he might be able to withstand the general epidemic tendency and ward off the disease. We need only refer to the mass of evidence contained in the communications of our correspondents, added to our own personal investigations, as detailed in the preceding pages of this report, for confirmation of this view.

Our conclusions, therefore, while they must be, in the main, negative as to the existence of any definite exciting cause which, under all circumstances, will produce the disease, lead us to say with confidence that those communities, towns or cities whose sanitary regulations are strictest and best observed will be most likely to escape. Nor does it follow from the evidence adduced that any system of general municipal surveillance merely will suffice. It must be carried into the houses and daily resorts of the people. It rests equally upon the citizen as upon the city, to provide himself with all the means of safety in his power; to be vigilant to foresee and bar the approach of danger in the shape of household nuisances and impurities of every kind; to keep himself and his family from unnecessary exposure and excesses, and to govern wisely the walk and conduct of his daily life. While, therefore, we do not agree with some recent writers upon this subject, who boldly attribute the origin of the affection to these insanitary conditions themselves, we cannot resist the conviction that they are more than mere concomitants and accidents of the disease, and we must find in the lesson of the present epidemic the injunction of a stricter regard for the known requirements of hygiene in our habitations and our homes.

